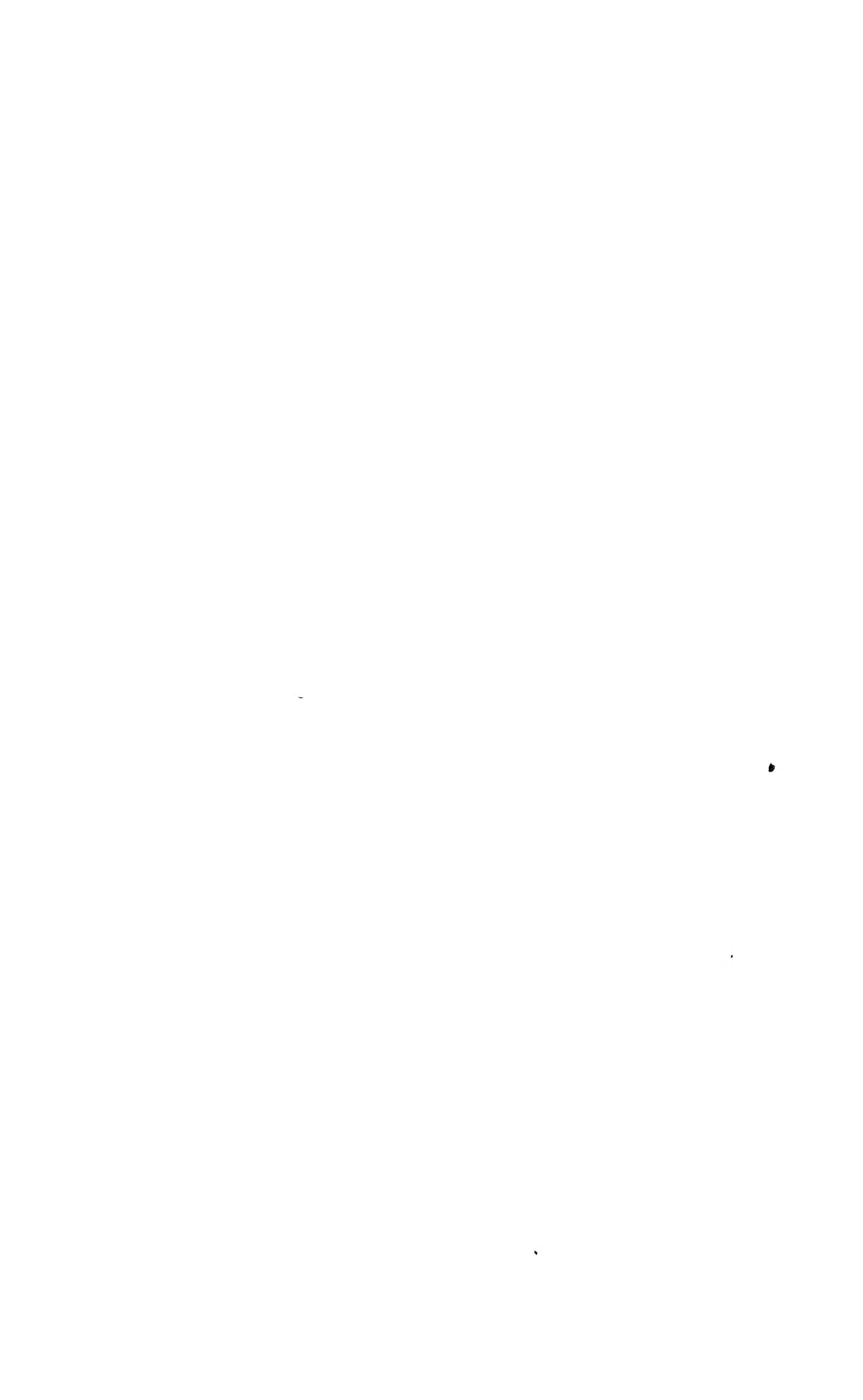




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THE VETERINARY JOURNAL. 15.1.2

A Monthly Review of Veterinary Science.

Editor :

FREDERICK HOBDAY, F.R.C.V.S., F.R.S.E.,

HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING

MAJOR IN THE ARMY VETERINARY CORPS.

HONORARY MEMBER OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION.

CORRESPONDANT ÉTRANGER DE LA SOCIÉTÉ DE MÉDECINE VÉTÉRINAIRE DU
BRABANT (BELGIUM).

Sub-Editor :

GLADSTONE MAYALL, M.R.C.V.S.

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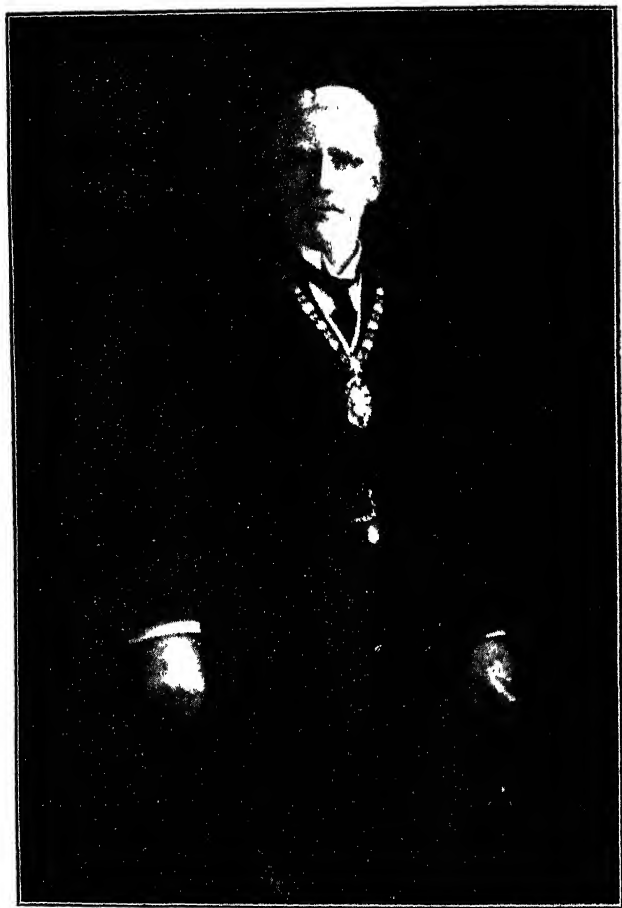


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Mr. JOHN McKENNA, F.R.C.V.S.
President of the Royal College of Veterinary Surgeons.

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OFFICIERE DU MERITE AGRICOLE (FRANCE).

CAVALIERE DEI S. S. MAURIZIO E LAZARO (ITALY).

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JANUARY, 1920.

Editorials.

MR. JOHN MCKENNA, F.R.C.V.S.

FEW men have devoted more energy, or given up more time to the forward progress of the Veterinary profession than our present President, and none have its well-being more at heart. Born at New Galloway, Kircudbrightshire, in 1864, he graduated, when only 21 years of age, at the Glasgow College, having been a pupil with the late Mr. Thomas Campbell, F.R.C.V.S., of Kircudbright. After acting as assistant for some years in Sheffield, Mr. McKenna decided to settle down in practice in Huddersfield, where his ability as a practitioner and his personal integrity soon gained a large and influential *clientèle*, whose numerous professional calls have made his life a very busy one.

Taking the Fellowship Degree in 1893, he became a Member of Council in 1901, and from that time forward has worked assiduously in forwarding every move which has advanced our welfare.

An energetic practitioner and extremely conscientious worker, Mr. McKenna has particularly at heart those measures which will benefit the student and be likely to fit him to become successful in after life, and his lifelong experience of men and things will be of inestimable value in this direction.

At the present moment, in the transition period from war to peace, the situation is a difficult and tedious one, and many extra problems will have to be solved which have not appeared on other occasions, but the members of the profession may rest assured that they are

in safe and cautious hands, and that during his period of office no trouble will be considered too great, and no effort will be spared to make the successful solution of these problems possible.

THE POSITION OF THE AMERICAN ARMY VETERINARY CORPS.

FOLLOWING so closely upon its new organisation, largely on the model of the British Army Veterinary Corps, it is of importance that the Veterinary Corps in the American Army shall maintain its status and continue to carry on as useful a work during time of peace as it did during the recent great war.

In our columns will be found an article by Major McMurdo, an American veterinary officer of great experience, wherein the matter of control is very ably discussed. It will be of especial interest to those officers who still remain in the regular A.V.C., and by no means without interest to the large numbers of others who have so recently been serving.

At the present moment the American Army Veterinary Corps is placed as a part of the Medical Department, and not, as in our Corps, in the Department of the Quartermaster-General. The suggestions are :—*First*—That it shall be organised and kept as a separate Corps. *Second*—That it be united with the Remount organisation, under a common head, into a new Corps. *Third*—That it become a part of the Quartermaster Corps. *Fourth*—That it remain a part of the Medical Department as at present.

The arguments for and against each and all of these are very clearly and lucidly put, and are well worth careful perusal. They will recall to the minds of some of our older R.A.V.C. officers the days when they had a similar problem to solve.

THE COLONIAL CALL

OUR profession is not distinguished for its perfect organisation. Individualism has its good side, and it is not beneficial to be lacking in enterprise, and all to be on a dead level. But young countries, like young people, possess life, energy, enthusiasm in abundance, and wise parents ought not to ignore the welfare of their offspring. The offspring may afford the power that enables us to get a move on. Cohesion and closer union between the graduates of our colonial colleges and universities and ourselves will be for the benefit of our science and art, and produce a greater driving force for advancement, and getting things done than if each country ploughs its own lonely furrow. In Congresses of future years we and our colonies must fill up the blanks in the advance of science that will inevitably ensue for

years to come through the devastated and dethroned areas of Central Europe.

Our own kingdom for veterinary enterprise is limited, but beyond in Canada, Australia, New Zealand, India, South Africa, the field is vast and largely untenanted and inadequately explored. The future will need men of keen vision and broad mind, and some giants in organisation and administration, if full advantage is to be taken of the land waiting to be cultivated. Our Council never did a wiser thing than when it opened its doors for colonial graduates to take the diploma of the R.C.V.S. Each of the men who qualified may be looked upon as a missionary from the mother country to her glorious children. We sincerely hope that the good work may go on. The children are worthy of all help and support, and they will be staunch and true to the motherland. In *savoir faire*, *bonhomie* and business tact we can teach them nothing; in technical skill and science, as applied in this country, they are well equipped, and have little to learn. It will be all to the advantage of veterinary science, art, and business to confer with them often, to listen to their views, to receive them with open arms, to help and encourage them all we can. Unity of request and demand as far as may be, and where it coincides as regards the mother country and the colonies, will come with the greater force to politicians, statesmen and Governments than from isolated, disintegrated, and spasmodic efforts to improve the scope of our domain and the status of our members.

Quite recently a colonial graduate who took his M.R.C.V.S. degree at the last examination of the R.C.V.S. wrote us as follows: "I firmly believe that one of the best ways to tighten the bonds between the Colonies and the Mother Country would be by the instituting of an Imperial Conference that would meet periodically, say, in London, and at which veterinary representatives of each of the Colonies may be privileged to attend and confer with representatives of the United Kingdom on matters veterinary affecting the interests of the Empire." The modern view is well put in the above quotation—it needs sympathetic consideration and support from us. The Empire view of veterinary matters is too little discussed and considered. If it is to fructify and develop on the best lines, and if we are to prove ourselves a virile, wide-awake and up-to-date band of professional men, we must give it earnest consideration and support in the times to come. Although a small body, let us show to the world that we are not lacking in grit, stamina, intellect, and united effort and far-sightedness in the interests of the welfare of our country and Empire.

G.M.

ANIMAL DENTISTRY.

It has been said that the teeth of mankind are nothing but a trouble from the cradle to the grave. That they are apt to decay, we all know. Dentists tell us that the teeth of men and women get worse from generation to generation, and as time goes on, scientists argue that we shall be more or less a toothless race. There is much about the decay of teeth that needs further explanation. Caries cannot be altogether due to the action of injurious micro-organisms on the dental tissues. Food, water, and heredity must play a part in the process. How is it that occasionally, in a town or district noted for the early decay of teeth, we come across individuals with perfect natural dental armoury, which lasts far into a good old age? Carnivora in their natural state are very, very rarely troubled with tooth-ache, and in almost every case the beautiful white aspect of their teeth is one of their marked features. The horse is perhaps the animal we are most often called upon to remedy dental defects in, unless we except the smaller breeds of house dogs such as Yorkshire terriers, Schipperkes, pugs, Pekinese, etc. It is perhaps a reflection on us that since the invention of the Santy and Wells forceps, somewhere about 1865, little scientific attention appears to have been given by the profession to the matter of dentistry. Rule of thumb rasping of the teeth at half a crown a time has gone on merrily from generation to generation. The public has been satisfied with it, but then the public is not given much to thinking, and the veterinary surgeon is fearful of making an enemy for life if he upsets the hoary half-crown tradition, or else the thought of "Why consider the matter more closely when the reward is so small?" enters his mind. We generally work in the dark in a horse's mouth, and oral operations are only roughly and imperfectly carried out. It is rather remarkable that a great number of equine patients do eat better after having the teeth rasped, but this may be due to the frequent giving of an alterative ball at the same time as the rasping takes place.

We have wondered for some time why some of our graduates, and especially the younger ones, have not devoted some of their time to study and experimentation with local anæsthetics in animal dentistry. Novocain has given excellent results in extractions in human beings, and some such anæsthetic might be beneficially and effectively employed in equine dentistry. Bearing on this matter, we recently came across an article in the *American Journal of Veterinary Medicine* for January, 1918, on "The Extraction of Molar Teeth of Horses," by Major L. A. Merillat, V.C.N.A. In this he writes: "To control the pain of extractions, we very highly recommend Bemis nerve-

blocking operation. For this purpose we use a 2 per cent. solution of cocaine hydrochloride injected with a long hypodermic needle into the region of the maxillary hyatus for maxillary molars, and into the region of the mandibular foramen for mandibular molars." The objections to extracting molars (especially where two or three have to be dealt with) in the horse or ox, with the patient under a general anæsthetic, are real and evident, and yet under the Amended Animals (Anæsthetics) Bill we are compelled to use a general anæsthetic. It does seem to us that this matter required further thought and consideration before scheduling, and with the mouth well open with a modern mouth gag, and effectively controlled, and a good light into it, full advantage might be made of the use of local anæsthetics, and a very thorough examination. Personally, we have had more trouble in remedying dental defects in cattle than horses. Not because the teeth are harder to extract, but on account of the difficulty in keeping the gag and the cow's head steady, getting the mouth well open, and combating the wider lateral play of the jaws. For cutting off overgrown molars there has been some thought devoted to the matter, and really *modern* tooth shears can now be obtained from the instrument makers. We wonder how many of the Veterinary Associations possess them? The old top-heavy shears were fairly effective, but they needed a man of brawn and muscle to operate them, and always reminded us of the use of a steam hammer to crack a filbert nut.

Dental instruments for animals are pretty expensive. They are not in regular use. They need to be constantly looked over and carefully cleansed and kept. The aseptic instrument is quite as important in animal dentistry as in the human case. These are reasons why it is better to have a full and duplicate or triplicate stock the property of an association, and promptly at the service of its members, rather than individual ownership. Mouth-gags are various and pretty effective. We pay a tribute of praise to Malloch's. It is handy, and though it does not open the mouth wide enough for extractions, it is quite a good one for ordinary examination and rasping of the molars. Young horses do not resent its insertion and presence in the mouth, and it can be slipped in the pocket and easily taken with us when examining horses for soundness away from home.

In canine dental practice veterinary surgeons have made fairly up-to-date advance. The man who first introduced the scaling of dogs' teeth deserves the blessing of the profession. It pleases the ladies, and *après cela qu'importe?* The best of it is, it pleases those who in the present day have perhaps the most money to spare. In canine dental practice the use of local anæsthetics has also to a large

extent been overlooked. Possibly because it is too much trouble. Ethyl chloride, novocain, eucaine, etc., are all handy, and *divinum opus est sedare dolorum*.

Our education is never completed; we can always learn something. More earnest thought needs to be given to the subject of animal dentistry. If we do not advance with the times, our science will become primitive and our art lost.

G. M.

Original Communications.

MILK FEVER WITH HYPER-PYREXIA-THROMBOSIS.

By F. T. HARVEY F.R.C.V.S.,
(*St. Columb.*)

History.—The cow had had several calves. She was of a Guernsey cross, and very fat, having been dry for a long time. She was a rich milker. She calved the previous afternoon, and the membranes were passed at the fifth hour. During the evening the cow was noticed to drink very slowly, but she fed, and was not considered to be out of sorts. She calved in the open, and remained out during the night. The following morning she was on her side and helpless. The breathing was heavy.

Mr. Fourie, M.R.C.V.S., saw the cow at 9.30 a.m. The jaws were fixed as in tetanus, temperature 105° F. The udder received the usual air treatment. We both visited the patient at 11.30 a.m. The temperature was now 108° F. Her state was desperate, and she seemed likely to die at any moment; her jaws were tightly clenched, and the body generally in a state of convulsion, the muscles of the orbits being especially involved. A condition of asphyxia seemed rapidly supervening, and there was a large collection of foam round the nostrils. There was no tympany, but it was impossible to get the cow into the sternal position. Quite unconscious, she presented a sorry appearance.

Treatment.—One ounce of chloral hydrate was passed into the rumen through a cannula, and the surface of the body was well douched with cold water. The patient was then turned over and the cold bathing continued. In one hour the temperature came down to 104° F., and the whole aspect of the case had changed. The trismus had disappeared, and the cow drank some water; she could now be kept up in a good position, and the breathing was quietening down. The uterus was not septic. At 7.30 p.m. the temperature was barely 100° F. The cow was drowsy, but comfortable, the kidneys and bowels were acting tardily. She drank water, but took no food. A hypo-

dermic of strychnine was given and some laxitive salines added to the drinking water. Second day, 10 a.m. Since 8 a.m. the cow had gradually become quite comatose (milk fever relapse). No temperature. The udder was again injected with air. Heart stimulants were given hypodermically. During the day the excretory organs began to respond, the head cleared, and the patient showed an inclination for food.

The progress of the case during the next few days was not quite satisfactory. After the third day she fed well, was fairly comfortable, and her appearance was good, but she remained on the ground helpless. The cow was slaughtered on the sixth day, and made an excellent carcase of meat. The owner, a retired butcher, reported that the only change in any of the tissues which he would regard as abnormal when the carcase was dressed, was the presence of clotted blood in some of the small veins in the sub-lumbar region.

Remarks.—The case is interesting from several points of view. So high a temperature is quite unusual in milk-fever, and it once more illustrates the very wide range of clinical phenomena one may meet with in a series of cases of the disease. The effect of cold water in lowering the body heat was particularly pleasing, it acted like magic. The presence of blood clot in some of the veins in the region of the loins is very suggestive, as such a condition (venous thrombosis) occurring in connection with the spinal meninges might explain the continuation of the paraplegic state. Plugging of the large veins is probably the cause of the state of gangrene found in the limbs in some instances, and pulmonary embolism is not an improbable cause of some of the cases of sudden death sometimes noted in cows which have apparently quite recovered from an attack of milk-fever.

A favourite theory of the older practitioners regarded milk-fever as being essentially of the nature of apoplexy. It would seem that ante-mortem clotting of the blood does actually occur in the veins in some fulminating cases of the disease, and that to some such change is due the failure of an animal to pull through after a very promising rally, or response, to the usual treatment.

The older men saw nearly all their cases end fatally, and in making post-mortems they noted appearances which suggested the apoplectic state, and accordingly called the disease parturient apoplexy. The moderns see most cows well after a comparatively brief illness, and argue that the disease cannot be apoplexy at all. Much may be said for both views, and one might divide cases of milk-fever into two classes, viz., those in which a minimum of histological disturbance occurs in the body, and those in which there is gross anatomical

change, or in other words, the cases which recover readily, and those which do not.

Everything will depend on the stage in which the disturbing element—whatever its cause or nature may be—comes under control. If this control or correction of disturbance does not happen, there follows anatomical change, and this, in some peracute cases, seems to occur quite early in the attack. For a solution of the problem of the real cause of milk-fever we must, I think, look to the endocrinologists and bio-chemists of the future. That it is intimately associated with some hitherto unexplained endocrine function of the mammary gland seems to me highly probable.

The remarkable development in modern times of the milk glands in certain cows is a marvellous phase in biology. It is impossible to over-estimate the importance of Schmidt's discovery in the evolution of the modern cow. It stands out as a landmark in the history of the dairy industry. The survival of the best cows as breeders enables the continuation of milking strains which in many instances would have been lost.

Will the cow of the future so perfect her own mechanism as to become more or less immune from the disease?

The feat of a cow giving 2,000 gallons of milk at one lactation can, I think, only be regarded as an example of functional giantism. It in all probability involves the pressure of an enzyme or catalyst or hormone in the blood-stream of the animal, and one having an action somewhat similar to that which *secretin* has when absorbed on the activities of the pancreas.

While the above thoughts were passing through my mind, I saw in *The Stockbreeder* an account of a cow named "Veracity" having given 51,000 lbs. of milk in five years, and the following sentence there occurred: "It is now definitely known by dairy shorthorn experts that were such cows as 'Veracity' to be rested for a year or two, and then artificially fed and 'forced,' she would easily yield 2,000 gallons at one lactation." Here we have a long rest and inaction resulting not in diminished working power, but in increase of capacity. The case is comparable to the internal combustion engine, which on being given a supply of petrol and current, starts away at full speed after a long rest. It is known that the cow does store in her system the fat soluble Vitamine and goes on yielding it up with the milk until her store is exhausted, but she can obtain this substance only from the vegetable kingdom; she does not form it, but merely hands it on. On the other hand, a hypothetical milk-forming hormone must be formed and stored in her own body.

Professor Arthur Keith (1) has recently developed the *Theory of Hormones* in order to explain the development of racial types in man, and giantism and dwarfism as applied to individuals.

He says : " Secretin is a hormone which effects its errand rapidly and immediately, whereas the growth or morphogenetic hormones thrown into the circulation by the pituitary, pineal, thyroid, suprarenal and genital glands act slowly and remotely. But both are alike in this : The result depends not only on the nature of the hormone or missive, but also on the local recipient. The local recipient may be specially greedy, as it were, and seize more than a fair share of the manna in circulation, or it may have ' sticky fingers ' and seize what is not intended for local consumption." Is it possible that the cells of the mammary gland of the cow may also become affected with " sticky fingers," and in error elaborate some substance not intended for local consumption, and which, gaining access to the blood stream, produces a condition of intoxication which we recognise as milk fever ?

Keith further suggests the probability of the existence of many other mechanisms regulated by hormone with which we are as yet totally unacquainted.

" At the beginning of a great mammary effort the pre-renal glands are set going by messages passing to them from the central nervous system ; they throw a hormone—adrenalin—into the circulating blood which has a double effect ; adrenalin acts on the flood-gates of the circulation so that the major part of the blood passes to the mammary glands. At the same time it so acts on the liver that the blood circulating through that great organ becomes laden with blood-sugar."

With such a mechanism in action, it does not require much imagination to picture the cow with her highly-specialised milk-forming apparatus experiencing disaster when something goes wrong with the machine as focussed in the udder. The correction of the disturbance by means of elastic pressure on the tissues of the gland is suggestive. The amount of blood circulating through the organ is reduced or stabilised, the working cells are flattened out also by the same pressure, and thus thrown into a resting state for a time, and the general toxic condition of the cow disappears. The cells having had " their week-end," so to speak, again begin the manufacture of milk under appropriate stimulation. If their metabolism is normal, the

REFERENCE.

(1) Presidential address on "The Differentiation of Mankind into Racial Types."

British Association for the Advancement of Science, 1919. Anthropological Section.

cow continues well, but, on the other hand, if it is irregular or erratic, toxin again finds its way into the blood-stream, and the cow is again poisoned, milk-fever relapse.

AN INTERESTING CRYPTORCHID.

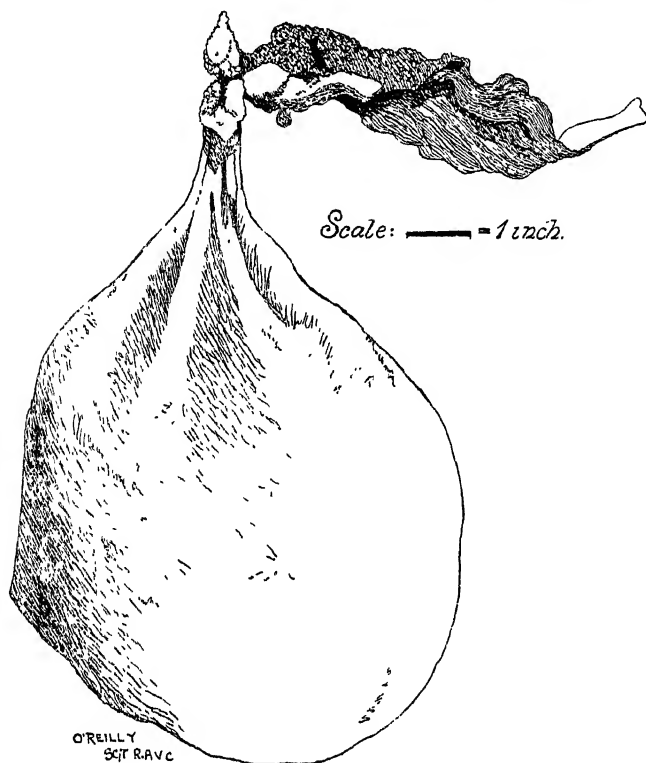
By FREDERICK HOBDAV, F.R.C.V.S.
London.

THE subject, a two-year-old shire colt, was purchased as a cryptorchid, and had begun to be very troublesome. The owner, therefore, decided upon operation, and this was done on the 8th of October, in consultation with Mr. Gerald Watkins, M.R.C.V.S., under chloroform, the patient being cast and secured in the usual way. Upon examination a scar was detected on the right side of the scrotum, and as exploration of the left inguinal canal discovered no evidence of the missing testis, the abdomen was entered. Here the missing cord was picked up and could be traced to pass through the coils of intestine, and when pulled upon it appeared to have a resilient body at its extremity, but this was so far away that it could not be reached, and its size prevented it from being pulled within reach. Failing in this, a large loop of cord was withdrawn and severed through with the écraseur, the floating body falling back into the abdomen. The inguinal canal was sutured, and for two days all apparently went well, but on the fourth day the animal was found dead in the box. *Post-mortem* examination revealed the cause of death to be a septic infection originating from the wound and spreading along the muscles of the thigh and the exterior of the abdomen. There was no visible peritonitis, and the missing testicle was lying loose in the abdominal cavity. The cord itself, including the portion excised, measured 13 ins., and the specimen (which was sent to Sir John Bland Sutton, F.R.C.S.), was like a child's toy balloon.

The undermentioned is this distinguished pathologist's description of it :—

“ The cyst is of the same shape, and as big, as a Rugby football. It contains a single chamber, filled with chocolate-coloured fluid. There are scars of ruptured loculi on the inner wall, indicating that originally the cyst was multilocular. A nodule of bone and soft tissue is attached to the inner wall by a narrow base, otherwise the inner wall is smooth. The outer wall of the cyst is covered by a loose capsule. On microscopical examination I found the testicular tissue quite outside the large cyst, so that it agrees with the dermoids, and is extra-testicular. The pedicle contains the usual arteries and plexus of veins.”

It is interesting to note that in the entire absence¹ of testicular tissue the sexual propensity of the colt still persisted² as the owner



of the animal stated that it had become a danger to other animals and a perfect nuisance.

SOME INTERESTING CRYPTORCHID CASES.

BY MAJOR W. J. ASCOTT, M.R.C.V.S.,
Bideford.

ENCLOSED are two photos of the testicles of two "rigs" which may be of some interest to those who wish to practice the operation. No. 1 interested me at the time—nearly twelve years ago—very much, and I learnt a sharp lesson (at the expense of my client, some will say) from my blunders, and although I was not then, nor am I now, at all proud of the operation, I send the notes of it along so that possibly someone else may profit by them.

Subject.—A half-bred five-year old of the 'bus horse type, the property of a small dealer, for whom I had previously operated on three cases successfully, and who had bought him cheap because of

his rig propensities. The owner thought he had bought an easy subject, as he was positive he could feel both "stones," and on examining him standing, I thought so, too; at any rate, I thought the right one would be quite easy as it could be grasped outside the canal, but the left one was in the canal, not so loose, and therefore perhaps more trouble. I operated on the left side first, but soon found the object was not the testicle, but a large inguinal gland. I had gone so

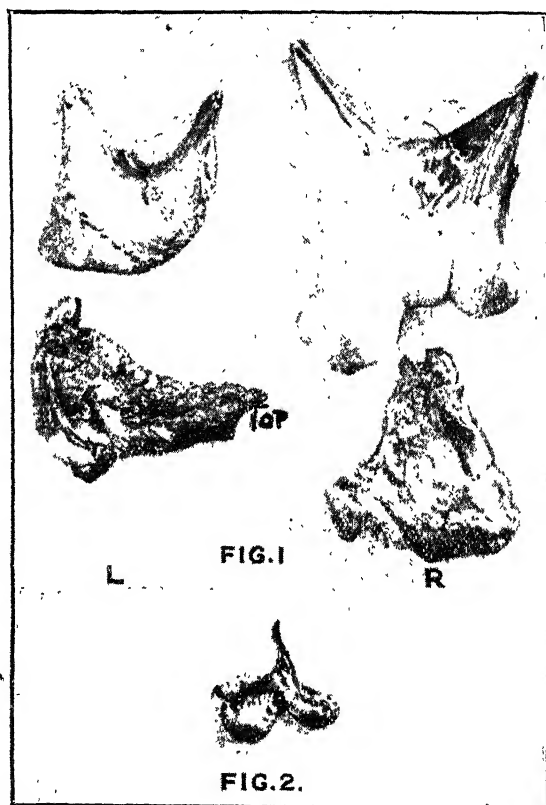


FIG. 1.—SHOWING THE TESTICLES AND ALSO THE TWO INGUINAL GLANDS.
FIG. 2.—AN ABNORMALLY SMALL ABDOMINAL TESTICLE.

far, however, before discovering my mistake that I thought it best to complete its removal, and then proceeded in the usual manner to enter the abdomen where I soon found the missing organs. I then, quite heedless of my previous lesson, removed what we both thought to be a testicle, but found to my chagrin and disgust it was also an abnormal gland. There was nothing for it but to carry on, and I was rewarded with the good specimen shown. Fortunately the patient did very

well and made a good recovery, but I repeat I was not at all proud of my blunders. The lower left gland in the photo should have been turned half-left for photographing, *i.e.*, it should have been fixed in the same position as the right. Both were pedunculated, and the right one was quite loose to handle. The second photo is only interesting because of its size. It could have easily been contained in a walnut shell, and yet although so miniature, was a perfect specimen. I was pleased with this case, as it was one of my early cases, and the first I had found by following the guides given by Professor Hobday in his little work on the subject. I found it near the neck of the bladder. It is also easily the smallest I have so far found in over 150 cases.

INTESTINAL ABNORMALITIES IN A MARE.

By J. B. TUTT, F.R.C.V.S., and J. F. D. TUTT, M.R.C.V.S., F.R.M.S., F.Z.S.
Winchester.

ALTHOUGH it is not at all uncommon on post-mortem examination to find now and again some anatomical deviation from the normal, the conditions which we found at a recent post-mortem examination seem so very exceptional that we feel bound to record them.

Subject.—The subject was a valuable in-foal shire mare (served in May), seven years of age.

Previous History.—The mare slipped her foal last year. Beyond this she had never had a day's illness. This was easily verified, as the owner bred her himself.

Clinical History.—On the night of November 25th, one of us (J.F.D.T.), in response to a telephone message, visited the patient.

The mare was uneasy at intervals, pawing the ground, looking round at herself, and going down with a slight tendency to roll. Temperature, pulse, respirations were normal and it may here be noted that this was constant through the whole period of illness. As she was in foal, two mild stimulant balls of Carbonate of Ammonia were given, and a quarter of a grain of Atropine Sulphate hypodermically.

Ether Meth. ℥ss. and Camphor ʒiii. were given every four hours in a pint of cold water.

She was seen again at 9 the next morning, and appeared the same, but as no defæcation had taken place, a grain of Pilocarpine was given hypodermically. Slight defæcation followed in about an hour. At 6 p.m. she was again uneasy, and went down when the colicky spasms came on (once or twice an hour), and was inclined to roll. We then gave two grains of Pilocarpine, with exactly similar results, and discontinued the Ether, and substituted for it ʒss. doses

of Chlorodyne (Hewlett), combined with fl52 Aether Hyponit. every four hours in a pint of water.

She continued like this for the next few days.

As the mucous membranes were somewhat icteric, one of us (J.B.T.) prescribed Glaubers Salts in 52. doses morning and night in the drinking water.

Between the fifth and sixth day the mare had diarrhoea, which became very watery in consistency.

A carminative mixture containing Tinct. Card. Co., Sodii Bicarb. and Ess. Menth. Pip. was then given.

On the eighth day there was a distinct improvement, and the mare appeared to be on the way to recovery.

On the ninth day she dropped dead in the box.

Post-mortem Examination.—The Ileum was found to open direct into the Colon. It had no communication with the Cæcum.

At its junction with the Colon (and situated at the "apex" of the Colon) there was a dilated mass of bowel, resembling a dilated stomach, with a capacity of two and a half gallons. Inferiorly this mass of bowel was loosely attached to the interior of the Colon by fascia-like tissue, and was easily separated from it, but superiorly it was directly continuous with the Colon and Cæcum.

It had a communication with the Ileum, but smaller than that of the Colon, and had a large communication with the Cæcum (large enough to comfortably accommodate an average human arm), and a third small, rather restricted, communication with the Colon.

The Cæcum was connected to the Colon throughout its extent by a solid mass of Muscular Tissue (half an inch thick, and over two feet in length). There was absolutely no trace of the usual connecting Peritoneum.

The Colon was ruptured about three inches below the Ileum opening. The Mesenteric lymphatic glands were very congested and enlarged, and stood out like two solid cords on each side of the muscular mass already referred to as connecting the Cæcum to the Colon. The Cæcum was full of fæcal matter, the dilated mass of bowel was literally packed with solid fæces. The Colon, on the other hand, was empty.

POST-PHARYNGEAL SURGERY.

By R. JONES, M.R.C.V.S.

(TOWN).

CASE I.—A three-year-old bullock which had been early in the winter suffering from actinomycosis of the back of the tongue and throat. The affected parts were painted with Tint. Iod. and Pot. Iodide given internally. I ceased to attend, and he was reported to

have apparently recovered. In the spring he was turned out with the rest of the bunch, and in the course of some weeks the bailiff reported that the same bullock was exceedingly bad, constantly coughing and making a distressing noise during respiration; practically unable to graze, and that he would be taking him up from grass past my premises at a certain hour. I examined his throat and could see a tumour at the back of the pharynx, hanging in front of the larynx, the symptoms as described by the bailiff, and the bullock fallen off in condition.

I arranged to go the following morning to destroy him if unable to remove the tumour with a view to ultimate recovery.

In the struggle and exertion of being thrown, he became exhausted before I completed the tying, and had I not hurriedly opened into his trachea, he would have suffocated. He immediately recovered himself when the breathing was relieved. A tracheotomy tube was inserted and I placed a mouth gag and examined the throat. I found a mushroom-shaped tumour attached with a pedicle about $1\frac{1}{4}$ inches to the posterior surface of the pharynx. I tried to tear through the pedicle with my fingers, but failed. Without much difficulty I got the ecraseur chain round the pedicle close to the mucous surface, and removed the growth. I did not see the case afterwards, but my daughter called daily to dress the tracheotomy wound, which was soiled by a little food escaping. Nothing further was done to the throat, and the animal was fed on mashes and a little grass for some days. He made a complete recovery and was sold with the rest.

CASE 2.—I was asked to see an incalf heifer which was making a noise in breathing. I found the heifer as described, and proceeded to examine her throat. It proved an extremely difficult matter to make anything like a thorough examination of her, and I decided to let her calve before doing anything further, as she was able to graze fairly well.

A few days after she had calved, I was informed that the condition of the throat was such that the breathing was very distressing, and the heifer unable to take any nourishment. From what I could see and feel in the throat when making my first examination, I suspected an abscess on the superior surface of the pharynx. I had her taken out of the building to a field close by, never suspecting that the difficulty in breathing was such that there would be any danger of suffocation in the struggle of throwing. It was proved that I was wrong in my conjecture, for I had to hurriedly open the wind pipe in this case also, and insert a tube.

When the gag was placed in her mouth, I made a manual examination of the throat and found the superior surface of the pharynx much swollen, thereby interfering with the breathing and deglutition.

With some force I pressed my fingers through and made a forward tear in the membrane. This was followed by a gush of pus, and I immediately placed my hand on the tube in order to assist her in coughing any matter that might have escaped down the trachea. No further treatment was applied to the throat, but the tracheotomy wound was dressed daily.

The moral from these two cases is—never operate on the throat when there is difficulty in breathing without previously performing tracheotomy.

CASE 3.—This case was on the same farm as No. 2. A barren cow had what appeared to be a tumour deep in the neck, in the jugular furrow, a few inches from the larynx, between the trachea and the cervical vertebræ. Such was the pressure exerted by the swelling that the trachea was pressed downwards, giving to the lower aspect of the neck a distinct curve. When I first saw the cow, she was able to take nourishment fairly well, and I gave the owner a bottle of liniment to rub on with a “wait and see” idea.

In the course of a few days I had a message saying the cow was unable to swallow anything, but that the breathing was not interfered with.

I pointed out to the owner that there was a certain amount of danger in the operation, and he said: “It is a case of operating or dying.”

The cow was thrown on her right side, and whilst I was washing the seat of operation, the chloroform mask was put on. When she was got under the anæsthetic I made an incision about five inches long and dissected carefully down to what proved to be an abscess. I pressed the jugular vein upwards and the long muscle of the neck (sterno-maxillaris) downwards. When I had dissected on to the swelling, I ordered one of the men to put his hand on the opposite side of the neck and press the enlargement towards me. I inserted a trocar and canula, and when the former was withdrawn, thick pus oozed out. I used a director to guide the scalpel and made a good opening in the abscess and washed the cavity out.

I separated the muscle and tissues from the trachea and made an incision through the skin on the lower aspect of the neck opposite the operating wound, so as to ensure good drainage. The abscess cavity and the drainage wound were syringed every day. The communication between the two wounds was kept patent until the abscess cavity had completely healed. The cow eventually recovered and gave no further trouble. I may say that the amount of blood lost during the operation was quite insignificant.

General Articles.

AN INTRODUCTORY ADDRESS ON THE THIRD EYELID.*

Delivered at the Middlesex Hospital on October 15, 1919.

BY SIR JOHN BLAND-SUTTON, F.R.C.S. ENG., SURGEON TO THE HOSPITAL.

MR. PRESIDENT AND GENTLEMEN,—The Fates have been kind and allowed me a little leisure to take up a study that beguiled me in my early days. As a teacher of anatomy I took a keen interest in the metamorphoses of muscles, and I will attempt to tempt freshmen, some of whom may regard practical anatomy with distaste, perhaps with disgust, to study some remarkable changes in the muscles of the orbit, and though they are not mythic fancies, like the metamorphoses described by Ovid, some, at least, are as wonderful and rest on a solid foundation of fact. I want to encourage the student of human anatomy to realise that, apart from the practical value of a knowledge of human anatomy to physicians and surgeons, there is an aspect of anatomy that will lead him into some fascinating realms of speculative science. A striking example of this occurs in the muscles that move the eyelids of reptiles, birds, and beasts.

THE MUSCLES OF THE ORBIT.

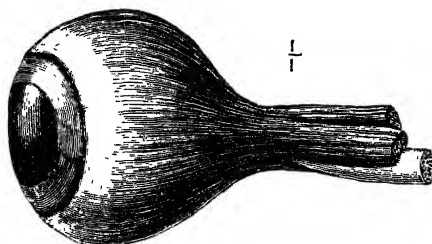
Can anyone dissect the orbit without feeling a deep interest in the neat set of anatomical structures it contains? A little anatomical world! The study of the morphology of its muscles increases the interest. The muscles form two sets—one set moves the globe and the other the lids. Those that move the globe number six, four straight and two oblique. The straight muscles, from their position in man's orbit, are known as rectus superioris, rectus inferioris, rectus internus, and rectus externus. These, according to their position, move the eyeball upwards, downwards, inwards, and outwards. The oblique muscles produce rotatory movements, and the complex movements occurring from the combined actions of the oblique and straight muscles have led to much controversy and speculation.

The straight muscles are thin straps arising around the optic foramen, at the apex of the orbit, and are inserted into the sclerotic coat of the eye near the margin of the cornea. They form a hollow cone round the optic nerve. The oblique muscles lie outside this muscular cone. The superior oblique is sure to attract attention because it threads a neat fibrous pulley at the inner (nasal) corner of

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the orbit; this pulley deflects it at right angles to be inserted on the globe, towards the outer part of its periphery. The inferior oblique

FIG. 1.



Eye of sheep showing the retractor bulbi muscle.

is a short muscle arising from the floor of the orbit at a spot diagonally opposite to the pulley of the superior oblique.

A remarkable feature of the orbital muscles is their monopoly of three cranial nerves. The third cranial nerve, known as motor oculi, supplies the internal, inferior, and superior rectus, as well as the inferior oblique and the levator of the upper lid. The fourth cranial nerve, trochlearis, is monopolised by the superior oblique, and the sixth cranial nerve, abducens, goes exclusively to the external rectus.

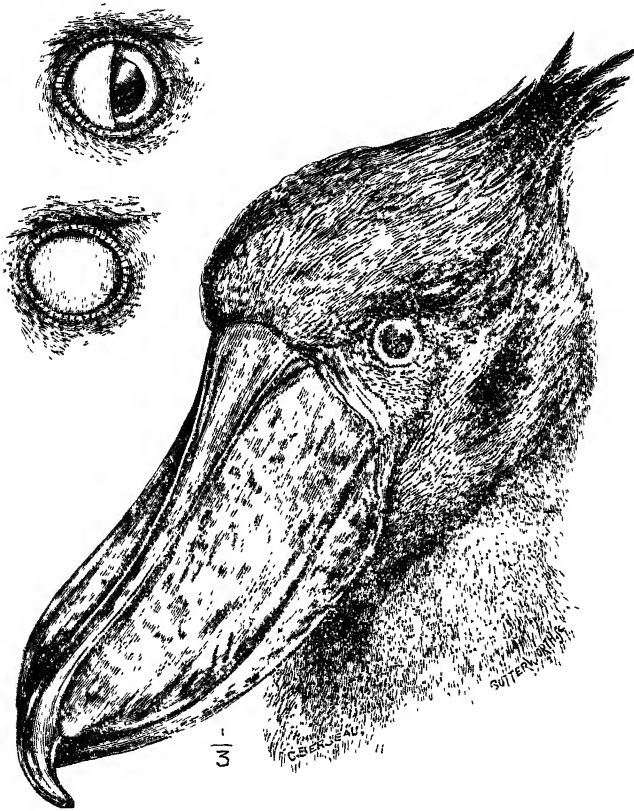
Compared with the majority of vertebrates, man has a small number of muscles in his orbit. The six muscles just described are constant. There is in addition a long muscle to raise the upper lid. Men and monkeys possess only two eyelids, but many mammals, birds, reptiles, lizards, and amphibians possess three. The third eyelid, a very plastic membrane, anatomically and morphologically, is moved by an interesting set of muscles lodged in the orbit. The upper and lower lids are moved by a simple muscular mechanism. The upper lid, very movable in man, is raised by its special muscle, *levator palpebræ superioris*. The lower lid is not very mobile and lacks a depressor; both lids are closed by a muscle with elliptical fibres—the *orbicularis palpebrarum*, a muscle of expression, supplied by the facial nerve. In birds the lower lid is very mobile and has a well-marked depressor muscle, corresponding in shape, dimensions, and power to man's levator.

The muscle that moves the third lid may be studied in its simple condition in a horse or a sheep. When the levator and the four straight and two oblique muscles are removed a funnel-shaped muscle surrounding the optic nerve will be exposed. This is the retractor bulbi, and as it resembles a cave lodging the optic nerve it is also called the choanoid muscle.

THE RETRACTOR BULBI.

This muscle arises from the apex of the orbit in common with the straight muscles. Its origin is tendinous and narrow, but as the muscle advances along the orbit it spreads out like the gamopetalous corolla of a primrose and envelopes the optic nerve, which resembles the style ; the expanded portion of the muscle is inserted into the sclerotic coat of the eye within the embrace of the four straight muscles. (Fig. 1.)

FIG. 2.

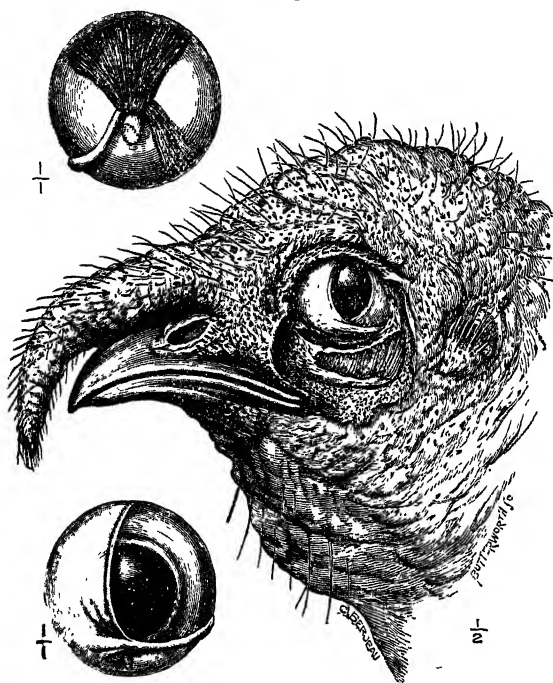


Head of shoebill. The insets show the eye in partial and complete eclipse.

It is supplied by the motor oculi. When the retractor bulbi acts it draws the eyeball into the orbit and at the same time the third eyelid, or nictitating membrane slips across the cornea. When the muscle relaxes, the membrane, being elastic, retreats and refolds itself on the nasal side of the orbit, like a folding blind or shutter. Veterinary anatomists teach that when the retractor draws the globe backwards the pressure causes the soft fat within the orbit to bulge forwards and

thus push the nictitating membrane over the eye. Whichever explanation may be offered, this at least is true : The retractor muscle is respon-

FIG. 3.



Head of turkey. The insets show the pyramidalis and quadratus ; also the termination of the tendon in the nictitating membrane. The relations of the tendon are also shown in the large figure.

sible for the movement of the membrane across the eye. When a horse is suffering from tetanus it is well known that if the eyelids be opened during a spasm the nictitating membrane will be found spread in front of the cornea.

There is no retractor bulbi in man's orbit, but on careful dissection a fibrous funnel-shaped tunic will be found lying within the embrace of the four straight muscles, intimately associated with them, and embracing the optic nerve. The anterior portion of the tunic spreads out on the posterior part of the sclerotic, repeating the method of insertion of the retractor bulbi. This tunic, or capsule, was described by the French anatomist and surgeon, Tenon, a hundred years ago ; it is named after him, Tenon's capsule. A critical examination of this capsule in the orbit of man and monkeys convinces me that it is the degenerate representative of the retractor bulbi as surely as the little pleat of mucous membrane, known as the semilunar fold, is the vestige, or remnant, of the third eyeball.

THE MUSCLES OF THE THIRD EYELID.

The muscular mechanism of the third eyelid or nictitating membrane of birds is easily studied in a turkey, owl, eagle, or ostrich. The membrane is neatly folded in the nasal side of the orbit and lies between the eye and its lids ; it sweeps across the cornea at right angles to the eyelids. A special gland supplies fluid to facilitate its movement. It is amusing to watch the movements of this membrane, especially in big birds. In the owl and shoebill (Fig. 2) it is pearly white ; the movements are very deliberate and give these birds a weird appearance. The shoebill is very grotesque with its huge bill, feathery crest, and large eyes, but when the nictitating membrane glides across the eye like a movable shade on a lamp, or more slowly producing crescent shapes resembling the phases of the moon, the varying shapes are singularly attractive and unforgettable.

The muscles that work the nictitating membrane are lodged within the orbit and attached to the globe ; they can be easily dissected in big birds like rooks, owls, or turkeys. Two muscles, known as the pyramidalis and the quadratus, move the membrane. The quadratus arises from the sclerotic above the optic nerve, and its narrowest border, the one nearest the optic nerve, forms a sling. (Fig. 3.) The pyramidalis or nictitator muscle arises from the nasal side of the sclerotic and ends in a long neat tendon that plays in a loop or sling formed by the quadratus ; it then winds round the convexity of the globe, under the conjunctiva, and ends in the lower angle of the nictitating membrane. In fact, the free border of this membrane may be described as the terminal expansion of the tendon of the pyramidalis. The muscular sling formed by the quadratus not only facilitates the action of the pyramidalis, but prevents contact of the tendon and the optic nerve. When the pyramidalis contracts it pulls the membrane over the eye ; the membrane retracts and refolds by its own elasticity.

CROCODILES.

In the crocodile the nictitating membrane is transparent, and when the brute is under water, though the membrane is drawn across the eye, he can watch an enemy or an intended victim with advantage. Paraphrasing "Alice in Wonderland" :—

Quite unconcerned he seems to lie,
Moves neither tails nor claws,
But when he winks that watchful eye
The prey is in his jaws.

In crocodiles and alligators the third eyelid is drawn across the eye by a powerful nictitator, which arises from the nasal side of the sclerotic and extends as a thick muscle half across the circumference

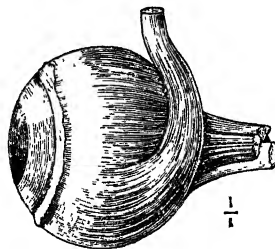
of the globe. (Fig. 4.) It ends, as usual, under the conjunctiva, in the lower corner of the third eyelid.

LIZARDS.

The muscles which move the nictitating membrane of the lizards are even more modified than those of birds. In some lizards the eyes are protected by special shields and plates developed from scales and skin. *Ablepharus*, a lizard of the Transcaspian Desert, has the lower eyelid fused with the upper; it is transparent, and, like a window, lets in light, but excludes sand. This modification of the eyelids is of use to lizards living among sand. When the South African Force occupied Luderitzbucht (now Bothaland) in 1914, the dust of that remarkable sandy, diamond-strewn desert, blown by the prevailing wind, proved so troublesome that the eyes of the transport mules required protection by goggles.

In lizards a long slender tendon fixed to the roof of the orbit passes in the nasal fashion to the lower corner of the nictitating membrane. (Fig. 5.) At the level of the optic nerve this tendon threads a sling in the bursalis muscle, which muscle represents the retractor bulbi of mammals; it arises from the back of the orbit, runs parallel with the optic nerve, and is inserted into the sclerotic coat of the eye.

FIG. 4.



Eye of an alligator, showing the powerful muscle that moves the third eyelid and the retractor bulbi.

When the bursalis contracts it acts on the tendon and draws the nictitating membrane across the eye. It is a rare arrangement for a muscle to be inserted into the tendon of another muscle. There is an example in man in his foot: the muscle is called *accessorius*.

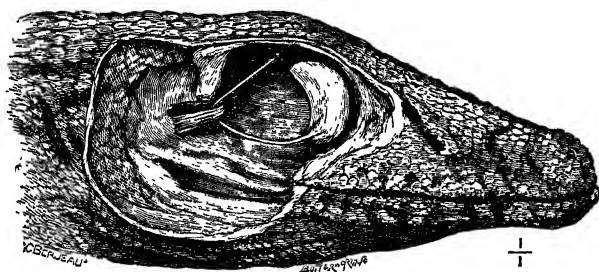
The pyramidalis is curiously modified. In crocodiles it is relatively big and muscular throughout. In birds it is one-fourth muscle and three-fourths tendon. In lizards the pyramidalis, entirely represented by a tendon, is activated by the retractor (*bursalis*) muscle. In sheep and many mammals the retractor works the nictitating membrane indirectly by acting on the globe. In man it is represented by a fibrous funnel that serves as the wall of a lymph-channel. In a fish, *Astroscopus*, some of the orbital muscles become electric organs.

ELECTRIC MUSCLES IN THE ORBIT.

The contractile substance of muscles is structureless and enclosed in a husk, called the sarcolemma. The jelly in each muscle husk receives the terminal of a motor nerve and serves as a means for the discharge of the force developed in nerve cells. Embryologists have discovered that in spite of the differences in structure of muscle cells and nerve cells they have the same origin, but nerve cells are modified to originate impulses which are conducted by the nerves and discharged by the muscles.

Organs are not strictly adapted to one purpose ; they have a main function and subsidiary functions. Changes may gradually affect an organ and a secondary function become dominant. This happens to

FIG. 5.



The orbit of a monitor, *Varanus salvator*. The eye has been removed to show the tendon representing the pyramidalis and its relation to the nictitating membrane, and a portion of the bursalis muscle. (Museum Royal College of Surgeons.)

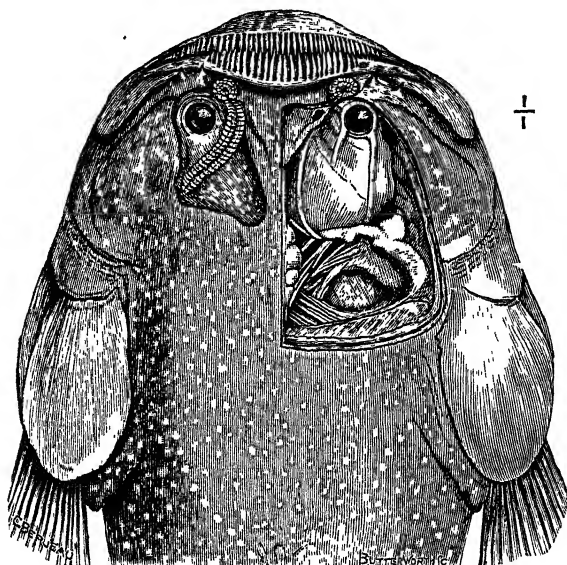
a surprising degree in some fishes, for definite tracts of muscle are so modified that the electric property predominates. In such fishes the electrical muscles, like ordinary muscles, are under voluntary control and become exhausted by use.

Electric muscles exist in several fishes—torpedo, skate, electric eel (which is not an eel), the stargazer, and the mormyr, a fish of peculiar shape living in the Nile. It was venerated by the ancient Egyptians and depicted on monuments. The proof that electric organs are modified muscles is furnished by the skate. In this fish the electric muscles lie in the tail. When the skate is young and like a big tadpole its electric organs are muscles, and Ewart succeeded in tracing the transformation of the muscle cells into electric cells.

The eyes of the stargazer are on the top of its head and the mouth is in such a position that, without knowledge of the cunning contrivance in the orbits, it would not be easy to understand how this fish secures food. Each orbit is roofed with a patch of soft skin, and this covers an electric organ. (Fig. 6.) The fish lies in the sand, and small fishes passing over it, paralysed by an electric shock, tumble into its

open mouth. In an example dissected by Dahlgren the stomach contained a number of small swiftly swimming fishes, such as young herring and mackerel. The electric organ lies in the midst of the orbital

FIG. 6.



Orbit of the Stargazer, dissected to show the electric muscle.

muscles, and receives a large branch from the third nerve and branches from the trigeminus (Sylvester).

Progress in the acquisition of reliable knowledge concerning life depends on accurate instruments. For example, the minute structure of muscle was unknown before the invention of the microscope, and the elucidation of the physics of muscular contraction required the assistance of delicate measuring apparatus. An accurate knowledge of animal heat was obtained by the use of a reliable and delicate heat measurer, the thermometer, an instrument which proved that animals have within themselves a source of heat. To-day clinical thermometers are as common in nurseries as the toy called Noah's ark. John Hunter, when he laid by experiments controlled by Ramsden's reliable thermometers the foundations of modern knowledge on this important matter, never imagined that muscles are the chief source of animal heat.

The study of the muscles concerned in the movements of the third eyelid may cause you to reflect deeply on the absorbing subject of the physiology of muscles. Such a study may lead some of you to make

discoveries in physics and neurology that will one day make the world gape with astonishment.

References.

- Dahlgren and Sylvester : *Anat. Anzeiger*, 1906, xxix.
Lockwood, C. B. : *Journ. of Anat. and Phys.*, 1886, xx., 1.
Tenon : *Mémoires et Observations sur l'Anatomie*, Paris, 1806.
Weber, M. : *Arch. f. Naturgesch.*, 1877, xlviii., 261.

THE FUTURE VETERINARY CORPS OF THE
AMERICAN ARMY.

BY MAJOR C. D. McMURDO,
Veterinary Corps.

WITH the prospect of the adoption during the fall months of legislation for the reorganisation of the Army, it would seem wise for the veterinary profession to consider carefully some of the possibilities which this legislation may hold for veterinarians in the military establishment.

Under the provisions of the National Defence Act of June 3, 1916, the army veterinarians were given for the first time the rank of commissioned officers and the Veterinary Corps made a part of the Medical Department. It is understood that this move was with the tacit consent of the Quartermaster-General. The work of transferring the officers in their new affiliation was barely completed when the United States entered the war and no organisation had been completed. Consequently the Veterinary Corps under the Medical Department is only about two years old. With all the stress of actual warfare during this period it has, of course, been practically impossible to organise and develop the Veterinary Corps along the broad lines which could be followed in quieter days of peace. Emergencies had to be met as they arrived, leaving many questions of policy and procedure to be worked out when time should permit.

Notwithstanding these facts there has been apparent in certain quarters considerable agitation as to whether change in the affiliations of the Veterinary Corps is not advisable when Congress legislates for the new army. Several moderately well defined plans appear to have been suggested.

First.—That the veterinary service be organised and kept a separate Corps.

Second.—That it be united with the remount organisation under a common head into a new Corps.

Third.—That it become a part of the Quartermaster Corps.

Fourth.—That it remain a part of the Medical Department as at present.

In the nearly thirty years that I have been connected with the army as a veterinarian, and more particularly during the past eighteen months in which I have served in the capacity of a general veterinary inspector, I have had an opportunity to study the work of the Corps, and perhaps understand its possibilities as well, or better, than any one who remained on this side of the Atlantic, and the arguments for and against these plans present themselves to me in the following order :—

There is perhaps no more pleasant vision than that of the Veterinary Corps as an independent organisation, with its own brigadier general and staff, its own training camp and school, its enlisted personnel, and its duties clearly defined, with every member of the Corps working for the common good. However, no one who has had any experience with the military establishment believes this vision can become a reality.

Military history shows a constant repetition of the struggle for existence by the small organisation and for supremacy by the larger one. "The survival of the fittest" has been written many times over in the Army. It is doubtful whether, as a separate Corps, the veterinary organisation would last a fortnight. Perhaps a typical illustration of what is meant may be found in the history of the old Commissary Department. This Department had its birth during the Civil War, when, because of the need for greater efficiency, the Commissary was separated from the Quartermaster Department. It had its own Commissary General, and as an individual organisation it rendered excellent service. It gave its officers and men training in its particular line of work and developed a high degree of proficiency. In 1912 it was absorbed by the Quartermaster Corps (together with other staff departments), the principal argument for such absorption being that the Quartermaster Corps could, by adding one column to its books, carry on the work of the Commissary Department along with its own. No sooner was the absorption of this Department completed than its dissolution was begun. Its educational work has been discontinued, its *esprit de corps* has disappeared. Practically all that remains to-day of the Commissary Department is the crescent in red which appears upon cases containing subsistence supplies.

The possibility of the union with the remount organisation into a new Corps seems to have been the subject of discussion in the A.E.F. It is understood this plan contemplates the withdrawal of the remount branch from the Quartermaster Corps, and by union with the Veterinary Corps under a brigadier general, form a new organisation or Corps. It has been claimed that the work of the remount service and the work of the Veterinary Corps are so closely associated that they

might well be united under a common head. Except for this union at the head, it is contemplated that each organisation would function along its own particular lines.

Two points of objection to this plan present themselves.

It cannot be conceived that the Quartermaster Corps would allow the withdrawal of the remount division, and the removal of its work from the Quartermaster Corps as it exists at the present time. Quartermasters and public animals have been associated since the beginning of military history, and the present policy of the Quartermaster Corps is to extend its field of operation rather than to contract it, and it is not believed that it would look with favour upon the withdrawal of the remount service.

Although the remount service and a certain branch of the work of the Veterinary Corps are closely associated, the same is not true of all of the veterinary service as regards the animals of the army nor of that other and important branch of the veterinary service, the meat and dairy inspection. Just how this branch of the veterinary service is to be co-ordinated with the remount work is not clear.

The veterinary service is quite essential to the successful functioning of the remount service, but the reverse is not true, and a veterinary service is maintained at many points quite independently of the remount service. One unacquainted with military methods might, with excellent logic on his side, argue that rather than allow the Veterinary Corps to be made a means of enlarging the powers of the remount service, the Veterinary Corps might well be extended by assigning to it and to its officers the purchasing powers at present reposed in the Remount Service. It is, of course, unnecessary to point out that the Veterinary Corps must from the nature of things function as a professional staff corps and not as a purchasing or procurement branch.

It might appear to the casual observer that the Veterinary Corps would render the best service to the Government by being affiliated with the Quartermaster Corps, for the reason that its work lies along the same general lines. All animals purchased for the military forces are purchased by the Quartermaster Corps, but pass the joint inspection of quartermaster and veterinary officers. Public animals, while in charge of quartermaster officers, are supervised and treated by veterinary officers with a view to preventing inefficiency and relieving disability. All purchases of meat for food products for the military forces are made by quartermaster officers, but their inspection is placed under the control and supervision of the veterinary officers. Forage and grain for the public animals, purchased by the Quartermaster Corps is, or should be, inspected by veterinary officers. This

similarity of duties, has warranted the conclusion that these two Corps might well be amalgamated.

There are, however, these general reasons why such a procedure would not work to the best advantage, either of the Veterinary Corps or the military service. The inspection of animals and of meat and dairy products and of forage, should be conducted as separate and distinct from the purchase of these articles. In other words, the purchasing office should not be concerned in the determination of the quality of the supplies or animals offered. The inspecting officers should not be interested in the price paid. The accepted and published specifications are to be the sole guide in the determination of acceptable supplies or animals.

Because of the absence of professional literature, laboratory equipment and educational institutions in the Quartermaster Corps, and the well-known tendency of the layman to belittle professional training, the tendency of the Corps under such an affiliation would, it is thought, tend toward a lowering of standards, rather than a raising of them. If affiliated with the Quartermaster Corps, quartermaster officers would determine the qualifications of the veterinarians eligible for commissions. One needs but to glance over the history of the veterinary organisation at the time of the Spanish-American War, to find examples of the haphazard method by which the veterinarians were chosen for military service; at that time a number of veterinarians employed by the Quartermaster Corps were unskilled, uneducated non-graduates.

If the reader has any doubts as to the correctness of this statement, let him consult with some of the older veterinary officers in the present Corps.

As viewed by the onlooker the Quartermaster Corps is a tremendously large and constantly changing organisation. Beginning with the absorption of certain staff departments in 1912, it has during the past emergency undergone a series of transformations. Within itself there are smaller departments and branches. The Director of Finance and the Director of Traffic have been separated to a degree. The Motor Transport Corps has been an offshoot, in fact, the entire Corps may be compared to a huge maelstrom, in a continual ferment, and where the Veterinary Corps would end once it became a part of this mass, is difficult to conceive.

The principal objection to the present plan of having the Veterinary Corps under the Medical Department, may be found in the fact that the Veterinary Corps functions under the control of medical officers.

The answer to this objection is that at the present time we have not a sufficiently experienced personnel from which to draw our

administrative officers, and so long as the Veterinary Corps is a part of the Medical department it must be administered by representatives of the Surgeon General. It is confidently believed however that as the veterinary officers become better qualified in administrative duties they will be allowed a higher degree of authority and experience less and less official interference from medical officers.

Under either of the two plans outlined, however, the Veterinary Corps would operate under outside officers.

It seems then for us to choose in our own minds at least whether we will remain under the medical officers, or be placed under non-professionals.

In consideration of these two controls, it is suggested that you ask the men who had experience under both departments, whether they would prefer to work under the Quartermaster Corps, or under the Medical Department.

Remember that for more than twenty years, a large number of veterinarians in the army had been a part of the Quartermaster Corps. In that twenty years they have been granted the magnificent salary of \$100.00 per month and denied the privilege of wearing the army uniform, and the veterinarians in other branches of the military establishment have attained the lofty height of donning the army uniform, drawing the pay and allowances of second lieutenants, mounted, but denied the rank.

Preventive veterinary medicine is closely allied to preventive human medicine. The two sciences proceed along parallel lines and the results of the investigations of one are frequently of valuable assistance to the other.

The work of the veterinary officers in connection with meat and dairy inspection, is essentially sanitary. The sanitation of the army is a part of the work of the Medical Corps, and by extending the training of its members, they could take over the work at present done by the Veterinary Corps. With the Veterinary Corps a part of the Medical Department, there will be no occasion for such an extension, but with the Veterinary Corps as a separate organisation, it is not difficult to imagine conditions under which such an extension might be given serious consideration. The Veterinary Corps has had limited experience in organisation and administrative work. This is through no fault of its members, but due to the lack of opportunity. To endeavour to administer its affairs with inexperienced men surely would result in disaster. Some experience to illustrate this point might be cited from the history of the Corps during the past few years.

It was only through the untiring efforts of the Surgeon General that the rank of major was restored in the Veterinary Corps. That

the leading and patriotic members of our profession, who gave up lucrative practices and comfortable homes, some even their lives, to serve their country in her hour of need, were not compelled to serve as second lieutenants, was due to the vigorous insistence of the Surgeon General, who appreciated their need of greater rank.

In my work as general veterinary inspector during the war, I have been frequently in conference with officers of the Medical Corps regarding sanitary conditions in the camps. I have invariably received the heartiest co-operation from them as well as many valuable suggestions. In several instances I have had to solicit their aid in convincing the commanding officers that suggestions made by the veterinarians were practical and necessary to the health of the command and should be carried out. Without their assistance it would have been a very much harder, if not impossible, task to have established and put in force regulations governing the thorough inspection of all meat, meat products and dairy products consumed in the various cantonments and army camps.

The Medical Corps has always stood for higher education and a strict adherence to professional ethics. Associated with them we have the benefit of their extensive libraries and laboratories, as well as their instructors. As a strong argument in favour of the Veterinary Corps remaining a part of the Medical Department, it is only necessary for the reader to compare the results accomplished by the Corps in the United States with what was accomplished across the water, where it seemed that chaos reigned, not through any fault of members of the Veterinary Corps, as they knew what should be done and tried to accomplish results, but were hampered in their efforts through being placed under the Quartermaster Corps and having a layman at their head, while in the United States, under the interested and scientific direction of the Surgeon General, they not only worked in perfect harmony but developed an organisation which secured results.

An efficient corps has been built up in the past two years. The material to work with was excellent, but it was entirely unorganised and woefully ignorant regarding military system and discipline.

In presenting these views to the veterinary profession, I have only one thought in mind, namely, that in considering this very important matter, important not only to the Veterinary Corps, but to the profession as a whole, we may decide upon a plan which will meet with the approval of the majority of the members of the profession. No plan is acceptable which has not for its basic aim, the building up of a Veterinary Corps composed of scientific veterinarians of the highest professional and personal quali-

fications a corps second to no other and in every way a credit to its members, to the army and to the profession. We shall never be unanimous in details, but we should be united upon a general plan for the future. It is hoped that present grievances or prejudices will not be allowed to influence our decisions. Apparently the future of the Veterinary Corps promises much if we remain with the Medical Department. We shall share in the fruition of its plans. The Army Medical School will be open to veterinary officers. Its laboratories contain the veterinary section. Its training camps make provisions for its officers and enlisted men.

With the officers and men of its three Corps mingling thus intimately, in class rooms, laboratories, libraries, and camps, much will be done for the veterinary profession, in a professional, educational and social way. I believe in this direction our hope for the future lies.

Much has been accomplished under the Medical Department in the last two years. Shall we reject all that we have accomplished and start out on a new and untried venture? I sincerely hope not. I feel sure that any member of the profession giving this matter mature consideration will concur in my opinion that the Veterinary Corps will attain the best results, both for the Government and for themselves, to continue as at present in close affiliation with the Medical Corps. I will venture to predict that after the continuation of the present affiliation for a few years, the results will be so excellent and so acceptable to the veterinary profession as to have completely and for all time obliterated future attempts to bring about a change. —(*Journal of the American Veterinary Medical Association*).

MANURE DISPOSAL AS A FACTOR IN THE CONTROL OF PARASITIC DISEASES OF LIVE STOCK.*

MAURICE C. HALL, PH.D., D.V.M.

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The results of the work on hookworm disease of man in the southern United States and elsewhere in the world has emphasised the major importance of sanitation and especially of a proper disposal of faeces as a control measure for this disease. Not only hookworms, but the other worms parasitic in the digestive tract and its adnexa in man, depend on the faeces first of all as a vehicle for their transmission. But this is equally true for the parasitic worms infesting our live stock and domesticated animals. The eggs or larvæ of stomach worms, nodular worms, ascarids, *Strongyloides*, whipworms, tapeworms, flukes and even lungworms pass first to the outer world in the manure, and a

*(Reprinted from the *Journal of the American Veterinary Medical Association*.)

proper disposal of the manure is the first line of prophylactic attack.

While the importance of a proper disposal of fæces has been emphasised and is being emphasised as a control measure for such parasites of man as the hookworm, the proper disposal of manure as a control measure for a large number of important parasites of live stock has not been adequately emphasised. Yet the fact is that this point deserves special consideration. Our live stock is constantly exposed and re-exposed to parasitic infestation by virtue of the fact that these animals eat off the ground, so to speak, to a great extent. Our horses, cattle, sheep and goats graze on pastures, our hogs root up the ground in search of white grubs and hunt through swampy pig-pens for the corn which is dumped into the mud, our chickens pick most of their food off the ground or out of the soil, and even our dogs, as a rule, seem to think as much of food that has been tossed out in the back yard as of food presented in a clean utensil. This mode of feeding exposes the food of these animals to contamination, since the fæces of the animals are deposited on the ground, and the area in which the animal habitually spends its time is the area in which it feeds and which it contaminates. The prevention of this condition is for the most part impossible. The prevention of parasitic infestation as a result of this condition is a matter that calls for repeated treatment with suitable and adequate anthelmintics, thereby cutting down the supply of worms in the animals and so shutting down egg production at its source. Vigorous measures along this line may be expected to render the manure reasonably safe on the score of parasitic infestation, since parasite eggs must be produced in large numbers in order to permit of perpetuation of parasites under the operation of the laws of chance.

But while the manure deposited on the pasture is not a thing that can be readily controlled, the manure from the barns and other buildings where domesticated animals are housed is something that can be more or less controlled. Contrary to the general rule for human fæces, barnyard manure must be utilised as fertiliser, which means that it must go back to the fields somewhere. Now if the animals furnishing this manure were never on pasture and were always fed from clean troughs and racks, they would tend to lose any parasitic infestation they might have, the manure simultaneously tending to become free from parasite eggs and larvæ and safe for use on the fields anywhere so far as parasites were concerned. I have seen old horses which had been used in a large city and kept off pasture which had almost none of the strongyles of the large intestine which are so common in horses as a rule, and sheep raised under experiment conditions which were

almost free or completely free from stomach worms. But the farm animal from which barnyard manure or stable manure is obtained is usually only a transient in the barn or barnyard or stable. These animals are in the pasture every day or a part of the year, and the barnyard or stable manure is usually as infective to begin with as is that on the pasture.

There are two obvious lines of attack in disposing of the infective features of this manure. One would consist in treating the manure in such a way as to kill the parasite eggs and larvæ, and the other would consist in disregarding this feature and placing the manure where it would have little or no capacity for infecting stock.

The first method offers a field for a large amount of investigation, but this investigating has not been done. Broadly speaking, one would have to determine how long the eggs and larvæ of the various species of worms involved lived in manure piles, in spread manure, in closely packed manure; the effect of sunlight; the effect of moisture; the effect of various chemicals, the chemicals in turn being of a nature not to injure the fertiliser value of the manure. There are practically no data on this and little could be surmised without such data.

The second method is one concerning which we have adequate data. It merely involves the application of facts which are fairly well known, but which have received little emphasis in this connection. We have emphasised to a certain extent the value of stock rotation on pasture as a control measure for parasites. We know that if a pasture has one kind of stock on it year after year it becomes highly infested with the eggs and larvæ of the parasites which infest that kind of stock. We might state this briefly and alliteratively as follows: *Permanent pastures perpetuate parasites*. Such pastures are dangerous—for that kind of stock. They may be quite harmless for other kinds of stock. Thus horses may safely follow swine or follow ruminants (cattle, sheep and goats); swine may follow horses or ruminants; ruminants may follow horses or swine. These groups have worm parasites which in general are not transmissible to each other, so that the manure from one group is not infective for the other groups. The fact that all ruminants are infested with the deadly stomach worm makes it undesirable to attempt to rotate cattle, sheep and goats with one another.

But the extension of this idea of stock rotation to the disposal of barnyard manure and other manure has not been emphasised. I do not remember ever seeing the idea stated, yet it is probably in print. At any rate it deserves to be emphasised. Manure which is to be taken to the fields should be disposed of, wherever possible, with a view to its possibilities as a carrier of parasitic infestation. It will not always

be possible to make the application. There are dairy farms where only cattle are kept, and the manure from these cattle must go back to the pastures and fields where the cattle graze, unless exchange is made with neighbouring farms running different kinds of stock. There are horse farms, hog farms, and sheep farms in a somewhat similar situation. In such cases one might bear in mind that well rotted manure would be safer than manure which had not been held long or rotted. The time element involved here permits of the death of eggs and larvæ as a result of various unfavourable conditions, and the rotting process may well prove lethal, since in nature the worm eggs are washed on to the pasture and the larvæ are capable of travelling, in some instances, yards away from the manure deposits. It is also likely that lime would kill larvæ when added to manure.

However, there are farms where there is an option as to the disposal of the manure of two or more kinds of stock. Horse manure may be put where horses are to run or where cattle are to run ; where such alternative offers, it is advisable to put it where cattle are to run. The same principle applies to manure of ruminants, swine and horses. Where there is a considerable amount of poultry droppings, as there sometimes is, it may be regarded as safe for anything other than birds, and manure from other animals, generally speaking, will convey no parasites to birds. On the other hand, the fæces of man and the dog are always to be regarded as dangerous. While it is true that there is little necessity for considering the disposal of quantities of dog fæces, it is also true that the casual straying over our farms by dogs maintains a persistent supply of gid in sheep, hydatids in swine, other bladderworms in sheep and cattle, and other parasitic pests. While it is true that we do not make a practice of fertilising our soil with human fæces in this country as they do in China, it is nevertheless true that the informal practice exists in this country even if there is no statement of it as a formal agricultural measure. It is well known that in the Southern States there has been, and still is over a large territory, an almost total neglect of sanitary provision for disposal of fæces in the rural districts, and something of this neglect is true for some parts of the Northern rural districts. In human fæces we not only have the source of numerous parasites of man, but the source of such parasites of our stock as " measles " (cysticercosis) in cattle and swine.

It may be urged that much of this barnyard manure is ploughed under the fields so treated sowed to crops which will be gathered and not fed back to stock. Quite true ; and that it is a safe method of avoiding infestation. On the other hand, the ploughing under of manure for forage crops cannot be regarded as assuring safety.

SOME REMARKS ON PSEUDO-GLANDERS.

BY R. SCHNEIDER.

ALTERATIONS and affections of the nasal mucosa of the horse are very frequent. Amongst them are acute chronic and catarrhal affections, pustulous stomatitis propagated to the nasal mucosa by contiguity of tissues, wounds made by the nails, hæmorrhages occurring in anasarca, etc., and it sometimes happens that benign affections are believed or suspected to be glanderous. Bearing on this conclusion Schneider describes a nasal affection occurring on several horses, and in which the first lesions were identical with those found at the start of nasal glanders. Schneider examined the horses two days later, and found the following symptoms: On one of the sick animals a little rounded and red spot in the middle region of the left nasal mucosa; a bright red spot the size of a two-franc piece at the entrance of the right nostril; no discharge, no glandular enlargement. The second horse showed no lesions on the left nasal mucosa. Loss of triangular epithelial substance to the extent of a five-centime piece in the interior part of the right nasal mucosa, with a little erosion covered with a dry crust in the centre, but with no tumefied edges; neither discharge nor glandular enlargement. The third horse on examination with a nasal mirror, showed at the upper part of the left nasal wall four nodules the size of a pin-head, of straw yellow colour, with reddish borders; no discharge and no glandular enlargement.

The general state of the three horses was satisfactory. Ophthalmic reaction with mallein gave quite a negative result. The three horses were isolated and some samples of blood sent to Berne for analysis. On October 17th the veterinarian declared a fresh case. He found a horse which presented a red spot the size of a ten-centime piece on the right nasal wall, with a yellowish nodule at the centre. The ophthalmic reaction was negative. No blood sample was taken, the blood reaction having been negative on the other three horses. On October 20th the nodules had disappeared, the red punctiform spot without thickened edges were in process of cure. The other horses presented no similar lesions. This affection, in appearance so simple and inoffensive, has a certain importance, for it is a specific affection of obscure origin—the litter being on a foundation of fresh turf. Schneider believed that this "nasal eczema" was due to mycotic infection from the litter or hay. The benign progress, the rapid cicatrization of the nodules, as well as their non-contagiousness, allowed of the exclusion of glanders, but the ophthalmic reaction and the examination of the blood enabled shortening of the quarantine period to be effected, a very valuable thing for army horses at manœuvres or at the front.—G.M. *Swiss Veterinary Journal*.

Review.

THE EARLY HISTORY OF VETERINARY LITERATURE AND ITS BRITISH DEVELOPMENT. Price £1 is. Vol.—I to 1700. London: 1919. By MAJOR-GENERAL F. SMITH, K.C.M.G., C.B. pp. 373. Publishers: Bailliere, Tindall & Cox, London.

We have here a work representing an immense amount of patient research. The author states in the preface that the collection of the material for the book occupied the best part of ten years. Even so the reader wonders how so much could be accomplished in so short a time, for no one had previously written more than short sketches of a few of the best-known veterinary writers. The author's task was therefore to produce a book of which the plan must be original and of which most of the material must be taken from the original sources. There was nothing to guide him, no second judgment to which to refer in case of difficulty.

The volume is divided into two parts, the Renaissance being naturally the point of division. As culture prior to the Renaissance was European rather than national. Part I is an account of veterinary science in Europe rather than in England. Each author is dealt with in strict chronological order, and foreign authors subsequent to the sixteenth century are described only in so far as they have influenced opinion in England. Chief among these foreign authors are Columbre, Grison, Gorte, Heresbach, Ruini, the Italian lawyer of the sixteenth century, who is the father of equine anatomy, and Jacques Selleyssel, the greatest veterinary writer prior to 1700. Only Michael Harward, a forgotten Englishman of Charles II's reign, can challenge this supremacy.

Interesting as are the Grecian and Roman chapters, only the English works dealt with in Part I need detain us. The first English veterinary work is the Anglo Saxon "Leechbook," or "Medicinale Anglicani" of the 10th century. It was followed by the "Herbarium" (1000-1066) and "The Medicine of Quadrupeds," then, in the middle of the 13th century, by Walter de Henley's "Husbandry," written in Norman French. The "Anonymous Husbandry," 1272-130, and early in the 14th century by "the Seneechal or Farm Steward." These works give evidence of little veterinary knowledge, but show how gladly his animals were valued by the farmer, who had evidently certain ideas of veterinary hygiene.

To the 13th century belong a number of MSS. found in the British Museum. The minute care with which they have been compared, resulting very frequently in valuable bibliographical discoveries, reflects the greatest credit on the author. The story of Harleian MS. No. 6398, called the Boke of Marshals, and dated about the end of the 13th century, deserves special mention. The author discovered its identity with another MS., No. 5086, with a different title, and now for the first time identified. These MSS., of themselves of great interest to students of Middle English, are important to us as showing the state of ignorance and superstition then prevalent in respect of the veterinary art, and indeed of all arts and sciences.

Part II gives full and complete notices of all the well-known veterinary writers of the 16th and 17th centuries, together with

detailed accounts of each work written by them. In addition there are shorter notices of many hitherto unknown or neglected authors, and of these only will space permit us to speak.

Chief among the unknown writers is Michael Harward, who wrote in 1673 "The Herdsman's Mate," a born surgeon, and a "pioneer in intestinal surgery." His work is epoch-making, his operations alike splendid in conception and in execution. Christopher Clifford, in "The Schools of Horsemanship" (1585) gives quite an admirable account of the hygiene of the stable and shows what can be accomplished by a man of common sense, although he lacked education.

Crawshey (1636), a sound, practical man, gave the first account of cattle practice.

Nathaniel Grew (1676) lectured before the Royal Society on the "Comparative Anatomy of the Stomach." He does not seem to know much of the horse, but his account of rumination is complete save for the nerve supply. Lower (1667-68) showed the effect of division of the phrenic nerves on respiration. He also gives the first account in English of *corpra nigra* in the horse. Sir John Hoyer (1698) (Proceedings of the Royal Society) was the first to describe the grathological changes in the lungs in "broken wind."

The veterinary art has thus been traced from its very beginnings down to its scientific establishment in England, and it is safe to say that no important work has been missed. An enormous amount of reading of original books and MSS. has been done; detailed accounts have been prepared of every important work; the exact chronological position of science may be properly estimated; most careful comparisons have been made between the various authors to determine what is original, what borrowed and from what source. In respect of the discovery and identification of the Middle English MSS., a service has been rendered to scholarship. For the sympathetic account of Michael Haward all veterinarians must be grateful. The numerous and very complete references to the original MSS. and books, and to the very few writers, English or foreign, who have preceded the author in the history of veterinary literature, are of the highest value to the interested reader, to the student and to the future historian. The style is pleasant, epithet and comment both fitting and happy, and the matter is vitalised by the writer's unflagging interest in his subject.

The book is enriched by many handsome plates of the better known authors or of frontispieces, title pages of early printed books, etc. All who are interested in the development of veterinary medicine and surgery and in the case of animals, will find this work, this study of the "rock whence we were hewn," most interesting and satisfying, and will be grateful to Sir Frederick Smith for the ten years of painstaking and conscientious labour which he has devoted to his first volume.

Personal.

Hearty congratulations to our Allied colleagues, Veterinary Major Victor Drouin, of the Veterinary Department of the Ministry of War, French Army Headquarters, on being awarded a Distinguished Service

Order, and Doctor Cavaliere, Sacco Chief Veterinary Official to the Province of Cremona, Italy, on the Order of the British Empire.

Also to the following distinguished members of the profession in our colonies or in Allied countries, who have recently been elected Honorary Associates of the Royal College of Veterinary Surgeons.

General Jean Fray, Inspecteur permanent du Service Veterinary de l'Armée Française.

Colonel Eugene Nicolas, Vétérinaire Principal 2e Class. de l'Armée Française,

Colonnello Cavaliere Olindo Bortolotti, Director of the Italian Veterinary Services.

Tenente Colonnello Guido Finzi, Director of the Military Veterinary Laboratory, Milan.

Colonel David S. White, D.V.M., Director of Veterinary Service, American Expeditionary Forces.

Colonel Clarence John Marshall, D.V.M., Director of Veterinary Services, U.S.A.

Brig. General William John Neill., Director of Veterinary Services, Overseas Military Forces of Canada.

Colonel Charles Edgar Edgett, D.S.O., Director of Veterinary Services, Overseas Military Forces of Canada.

Colonel E. A. Kendall, C.M.G., Deputy Director Veterinary Services, Australian Imperial Forces.

It is with regret that we have to record the death of Mr. R. H. Bird, of Greeley, Colorado, a well-known M.R.C.V.S. practising in the United States, and a graduate of the Dick College, Edinburgh, in 1873. His death took place in St. Anthony's Hospital, Denver, Colorado, as the result of hemorrhage at the base of the brain, caused by an injury received whilst vaccinating cattle.

NOTICES.

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THE VETERINARY JOURNAL

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GLADSTONE MAYALL, M.R.C.V.S.

FEBRUARY, 1920.

PROFESSIONAL PROGRESS.

ALTHOUGH we have passed through the black period of war, it has not been all misfortune for our profession: In fact, it might almost, from the professional standpoint, be fairly put down as otherwise.

At all events we have not stood still, and in more ways than one we have made progress.

Certainly, in so far as the Army has been concerned, we have improved our status and established a reputation for usefulness which will stand for all time, and it will be a very short-sighted policy for any Army to commence a war without a well and properly equipped Department for looking after the animals in health and dealing with them when diseased. Without being in the least degree boastful, the Royal Army Veterinary Corps can truthfully say that in the Great War it "played its part."

The civilian, too, must not forget his gratitude to the Veterinarian, as had it not been for the careful precautions taken by the Army Authorities and the Board of Agriculture the stock of the country would now, for a certainty, have been overrun with sickness and contagion. As it is there never was a period when the live stock of this country was more healthy, and this, too, at the termination of the greatest war in history, a war in which millions of animals have been engaged.

For those of our graduates who have returned to civilian practice the situation is much changed from what it was five years ago, as in large cities the progress of motor traction has lessened the numbers of horses used for both pleasure and work. The town practitioner finds this out much more than his country *confrère*, and it is not possible to close one's eyes to it. In the country the enormously increased value of agricultural stock has made all classes of it worth medical attention, and the country practitioner has benefited considerably thereby. What the future will bring forth can only be surmised and time alone can tell, but for the present the farmer lives in clover, and when he is prosperous the country practitioner prospers too.

State Veterinary Medicine seems at last to be moving, and there appears to be a prospect of whole time appointments in each county under the Ministry of Health. If efficiently paid these will attract good men, whose influence will undoubtedly be felt in the efforts made to stamp out disease amongst our flocks and herds, and be of inestimable pecuniary benefit to the agriculturist and to the whole community. Canine practice is an important factor in all town practices, and affords many interesting cases which one does not get in the larger varieties of animals. It is quite time that our Colleges gave special attention to this side of Veterinary practice, as it has many points of its own and can be made a lucrative addition to the income of the general practitioner. Money is badly needed for the equipment of our Colleges in order to bring them up-to-date and in line with modern requirements. Here again the State should help, as at least we should equal, in this respect, our Continental *confrères*. The question, too, of the next International Veterinary Congress will have to be raised, and a proposal is already under consideration that it shall be held in America; probably, if this is arranged, it will be the best solution of what would otherwise be a difficulty. Progress during the next year must of necessity be slow for all professions, and it rests with ourselves to recognise this, but if all of us "do our bit" to make it sure, the profession will come out all right and eventually have, for the straightforward worker, as good an outlook as before the war.

THE VERMIN QUESTION.

QUESTIONS relating to the habits and destruction of vermin must, of necessity, interest us as a profession, especially those which include animal vermin, or those of the insect variety which play a part in the spread of disease. In connection with this subject the Vermin

Repression Society, having its headquarters at 44, Bedford Row, London, has recently been doing very active propaganda work against the rat and other plagues, and the result has more than justified its existence. It was largely owing to its support and activity that the present "Destruction of Rats" Bill became law, and a paper in this month's issue of the Journal by Mr. Parker, M.R.C.V.S., the Chief Veterinary Inspector of the Borough for Newcastle-on-Tyne, on the subject shows the necessity for adopting measures to deal with these troublesome brutes. It is to be hoped that the work of this society will not be confined to the destruction of rats alone, but take up the campaign against flies, lice, and many other pests which act either directly or indirectly as the transmitters of disease, and we in our profession should support the good work. From his training and his daily life the veterinary surgeon is the man who ought to pioneer subjects of this kind, and not allow members of other professions or the laity to take the lead. The opportunity is ours if only we will see and take it.

Original Communications.

THE SELECTION AND ADMINISTRATION OF GENERAL ANÆSTHETICS TO THE HORSE, DOG, CAT

By FREDERICK HOBDAV, F.R.C.V.S.
(London).

It is now the law that a certain scheduled list of operations on animals *must* be done under a *general* anæsthetic, and that for those of another scheduled list the operator, whilst still bound to use an anæsthetic, is allowed the option of selection as to whether it shall be a general or a local one. It rests with us, therefore, to select the anæsthetic which fulfils the above requirements, and to ensure that we are sufficiently expert in the administration to cause insensibility to pain, and yet not endanger the life of the patient. To give a general anæsthetic with the maximum of safety requires in animals, just as much as a man, or perhaps even more so, one person's undivided attention, and this is one of the difficulties with which the veterinarian is faced, in that in by far the largest proportion of cases he has to assume the responsibilities of both surgeon and anæsthetist at the same time.

PRECAUTIONS.

In selecting an anæsthetic, the age and condition of the patient, together with the chance which the animal has had of being properly

prepared, must particularly be taken into consideration, the pulse and respiration being especially observed.

General anæsthetics one can select from chloroform, ether, A.C.E., and A.E.C. mixture, and all of these have their advocates!

Whether, under this new Act, narcotic agents such as chloral, cannabis indica, morphia and H.M.C. mixture will be officially considered as anæsthetics and permitted to be used for the operations in Schedules 1, 2, and 3, remains to be seen.

Of *Local* anæsthetics we have cocaine, eucaïne, novocaine, stovaine, holocaine, eudrenin, codrenin, hydrochloride of urea and quinine, ethylchloride, and orthoform, with adrenalin, renastypin, suprarenin and styptics of that class of useful adjuncts.

In all cases, whichever is selected, it is of the utmost importance that the *method of securing* of the patient is such that there is the minimum of interference with the action of the heart and lungs. *This point cannot be too much emphasised* when tying up a large animal or securing a small one, and there is no doubt that it was neglect of this precaution which did a lot to give the impression (so common in my student days) that the dog was an impossible subject for chloroform.

The dietetic preparation of the patient, too, for exactly the same reason, is urgently necessary, as pressure on the diaphragm from a distended stomach and intestine is distinctly bad. Although not a believer, like some, in a dose of purgative medicine beforehand, I am a great advocate for abstinence from food on the part of the patient for twenty-four hours previous to the administration of a general anæsthetic, and also that no water shall be given for about six or eight hours. The anæsthetic acts better, and, in the event of any struggling, there is less risk of rupture of the stomach.

SELECTION.

As regards the selection of the general anæsthetic, my own experience leads me, up to the present, to prefer chloroform for the horse and adult dog, and A.C.E. mixture for the young dog and cat.

If administered on rational lines, with careful attention on the part of the anæsthetist and due precaution as to preparation as regards the patient, the risks are comparatively small; and in order to avoid pain, unless narcotics are to be permitted to be termed anæsthetics (if the law is to be kept), these risks must be taken by both owner and patient.

How to minimise them, or, better still, do away with them altogether, must be the aim of one and all of us, and it is only by careful

observation of our difficulties and rectification of our mistakes that this can be done. Interchange of ideas at Society Meetings helps very much to get such an aim perfected.

ADMINISTRATION OF CHLOROFORM TO THE HORSE.

Let us take now the administration of chloroform to the horse.

There are those amongst us who prefer to chloroform the animal in the standing posture, and others who always cast the patient first. I have had considerable experience of each, and except when dealing with a vicious beast upon which it is difficult to get the hobbles or ropes, I prefer to cast my patient first.

Then as to the use of an inhaler. Some practitioners object to it and use a sponge containing chloroform held over one nostril whilst the other is plugged or otherwise closed up. I object to this method on the grounds that I have seen the nostrils badly blistered afterwards, and I cannot say that I think that it has a single point in its favour over the use of a proper inhaler. An inhaler is, in my opinion, undoubtedly the best, and of the patterns of these we have Roberts' and Nelder's for the standing operation, Cox's and Carlisle's for the animals when cast. Personally, I do not like the Carlisle Inhaler, as I have seen deaths from its use, and I do not think that any inhaler which covers up the whole of both jaws and does not enable the tongue to be well pulled forward is nearly as safe as the patterns which only cover the nostrils.

Especially, from experience, would I emphasise this for any prolonged operation.

Although, when chloroforming standing, I like either Roberts' or Nelder's Inhaler (these both cover the whole of the mouth and nostrils), for getting the animals down I prefer to change to a Cox's pattern if the operation to be done is to be a prolonged one.

The Carlisle Inhaler can be used for chloroforming an animal standing, but its weight and clumsiness make it objectionable, and there is also difficulty sometimes in getting enough chloroform applied.

The secrets of success with chloroforming standing are to have plenty of space in which to do it—a field or large, clean straw yard is ideal—and secondly not to fight against the horse, but to do something which will attract his attention during the first four or five minutes in which he is inhaling the strange vapour and wondering what to make of it. Once he becomes drowsy and stupid it is not difficult so to regulate matters that he falls down quietly somewhere about the situation in which he is required. To do this a rope is put on either side of the head-collar and a man is placed on each with

instructions to humour and follow the horse's movements in such a way, as far as possible, as to keep the animal walking in a circle if he shows any inclination to be restless. The operator himself then attracts the horse's attention by making sounds, or in other ways, until stupor comes on. The late Mr. Richard Roberts used to advocate commencing with two ounces in the mask for an ordinary sized colt, and I have found no reason to alter his procedure.

For the cast animal I am very fond of Cox's pattern of inhaler, as it is cheap, easily cleaned, readily portable, and, I believe, the safest we have for the administration of chloroform to the horse. It should be sufficiently large and "roomy," so that there is no pressure on the wing of the nostril. Many of the patterns made are too small for general use. It can be made collapsible, and it is thus more portable for carrying about the country. I object strongly to the use of a sponge for the chloroform, and also to the use of vaseline or other grease to the nostrils. Instead, I prefer a pad of cotton wool about 12 or 14 inches in length, taken off one of the ordinary rolls of absorbent wadding in general use, and this can be folded in such an economical way that it will present a fresh clean portion to a succession of at least 12 successive patients, and I have never once seen a blistered nostril follow its use.

This, placed in the mask and covered by a horse rug or blanket once or twice folded in a certain way, so that there is no danger of asphyxia, forms a method which I have used and seen used satisfactorily many thousands of times.

The tongue, before the chloroform is applied, should always be pulled well forward, and in order to keep it there it can conveniently be secured by a loop of tape, the ends of which are fastened to the side of the head, collar or halter. To this I attach very great importance, and the hint originated from one of my old students, Mr. Hewer, M.R.C.V.S. With this method I have never seen a torn frenum, as sometimes occurs when the tongue is held by a man. As regards the amount of chloroform to put on to commence with, I always start, in the case of an average adult horse, with an amount varying from an ounce and a half to two ounces. Experience has taught me that when one exceeds this amount to commence with, provided the animal is getting it all, one can readily get into the danger zone, and I have seen four ounces produce death within a few minutes when improperly given. Put on, then, one and a half to two ounces, fold over the horse rug and allow, carefully by the watch, about eight or ten minutes before you expect a satisfactory anæsthetic. This will be sufficient to last, in the average case, for

about a quarter of an hour, and if more is added, this should be done at the discretion of the anæsthetist in two to four drachm doses.

In hot weather chloroform evaporates more rapidly than when the weather is cool or cold, and for this reason the dose administered is slightly smaller on close, hot, depressing days than when the weather is cool.

For most operations on the adult horse, a short anæsthetic is all that is necessary, and to produce this the method of shutting off the air is carried out to a much greater extent than one would dare to do in the smaller animals. If one produces slow, deep chloroform anæsthesia in the horse, and this is then maintained for a prolonged period continuously without any evidence of returning consciousness, the animal is apt to lie for a considerable time after the inhaler has been removed and to get hypostatic congestion of the lungs and chloroform pneumonia as a sequel. To obviate this, a horse in this condition should not be allowed to lie more than ten or fifteen minutes without being turned over.

SYMPTOMS OF DANGER.

The Symptoms of danger are snoring, irregular breathing, and a gradual slowing down of the respiration, or the latter may cease suddenly. Upon observing any one of these symptoms the chloroform must be at once removed and the nostrils well opened to the air.

ANTIDOTAL TREATMENT

Antidotal Treatment, which should all be placed ready beforehand for instantaneous use, consists in pulling the tongue well forward, injecting a full medicinal dose of Scheele's Hydrocyanic Acid hypodermically or pouring it in the back of the throat (half a drachm to a drachm is what observation has taught me to advise as the dose), applying the vapour of Liq. Ammon. Fort. to the nostrils, and commencing artificial respiration, the horse lying, preferably, on the right side. The latter is best done by standing on the ribs (with the aid of a friend to obtain steadiness) and performing jerky pressures on the chest. Do not leave the patient until normal breathing is well established again.

ADMINISTRATION TO THE DOG AND CAT.

For the dog and cat the securing of the abdomen in such a position that free play can be given to the organs of the chest is an absolute essential to safety, and the use of hobbles or an operating table does this with a facility which cannot be obtained by the mere holding by attendants. This is the first important procedure to be observed, and the second is to administer the anæsthetic (whether chloroform

or A.C.E.) steadily, with one's whole attention, in such a way that it is well mixed with air. The correct safe precaution of chloroform air mixture is 1.9 to 2 per cent, and to get this an inhaler is the safest and most useful. If this is not present and the "open" method has to be adopted, a single piece of lint stretched over a wire framework can be used. An ordinary wire muzzle, which fits properly and does not press upon the nostrils, answers excellently, either for the dog or the cat. *The great secret is to allow plenty of air to mix with the chloroform and not to hurry unduly.* The best plan is to work by the watch, and not to attempt to get complete anæsthesia in any small animal under from four to six minutes.

Once the patient is completely anæsthetised it is for the anæsthetist to alternately cease the administration of the anæsthetic or to administer more at discretion, and to give the matter his whole and undivided attention. If the services of another practitioner cannot be obtained, an intelligent canine nurse or groom, *who will instantly obey orders*, can readily be trained to make a successful anæsthetist. Care and the concentration of one's whole attention on anæsthesiation are the first essentials; the symptoms of danger are easily learnt, antidotes should be close at hand, and experience will soon give the necessary confidence and knowledge.

Although within the past few months I have again seen the statement that the dog is an almost impossible subject for safe chloroform anæsthesia, I am still prepared to hold to the statement I made some 22 years ago before the Society of Anæsthetists, also in the *Journal of Comparative Pathology and Therapeutics* (as the result of over 1,000 experiments), and the *Veterinary Record*, that if anæsthetised with due care and on rational lines, *the dog is the best possible subject for safe chloroform anæsthesia.* The preparation of the patient consists in abstinence from solid food for about 12 hours prior to anæsthesiation. For the symptoms of danger one has to watch the respiration closely, and the best antidotes to be used if necessary are to speedily remove the chloroform mask, draw the tongue forward, apply a full medicinal dose of Scheele's Hydrocyanic Acid from a drop tube to the back of the tongue, and the vapour of Liq. Ammon. Fort. to the nostrils.

The same applies, in each case, for A.C.E. or A.E.C. mixtures as for chloroform.

POST PHARYNGEAL SURGERY.

By E. C. WINTER, F.R.C.V.S.,
Limerick.

In your January issue I notice an article from the pen of Mr. R. Jones, M.R.C.V.S., Towyn, on Post-Pharyngeal Surgery, and I would like to say that I have been familiar with the condition known

as "snoring" in cattle all my life, and have had a wide experience in treating this affection.

My mode of procedure is to catch the tongue of the beast in the left hand with a cloth and pull it well out, when the right hand and arm can be safely passed down the throat and a manual exploration can be made. Before doing this, it is wise to get two strong men to hold the cow, the one on the left-hand side passing his right hand between the horns catching the nose, and grasping the tip of the left horn with his left hand, and placing his back against the cow's shoulders. The man on the right-hand side in a similar position holding the right horn, it being impressed on both men the absolute necessity of keeping the beast's head straight and the muzzle elevated. If the abscess is fit for opening, I generally open it with the finger nail, so as to insure that the resulting wound will not heal too rapidly, making a large, jagged opening. If the finger nail is not able to effect this object, I use a concealed knife carefully attached to the wrist by a string or piece of tape. Should the abscess not be in a condition for opening, I apply a sharp blister all round the throat and call again a week later.

These abscesses are nearly always tubercular, and there is a probability of their recurring. In most cases immediate relief is given to the patient, but there is always a risk of the owner or attendant getting alarmed twenty-four or forty-eight hours afterwards and sending again for the practitioner. This summons may be disregarded, as the condition arises from the wound made in the throat, and the trouble passes away in a short time. With two fairly handy attendants it is quite possible to operate on any sized animal without casting or chloroforming, and the risk of choking is very slight, if it exists at all, and the hand and arm can be withdrawn immediately on any sign of this occurring. It is, of course, impossible in the case of small animals to get the hand and arm down the throat, and here we must use a gag and open the abscess with a long knife, but I find from experience that this condition is rare in young animals.

I must have operated on, in the last thirty-four years, some thousands of these cases, and the result has been favourable in 99 per cent. of them.

I have also met two or three cases of Polypi, most of them being enclosed in the abscess and surrounded by pus. They are easily dealt with by snaring them with a piece of strong string and cutting off with a concealed knife.

Some twenty years ago I had a nasty accident when operating on this latter condition in a small Kerry cow. One of the attendants

let go his hold and the cow, twisting her head around and getting the first molar a half inch into my wrist, severed the nerve supplying the thumb and first finger. I was, however, able to remove the tumour successfully six weeks afterwards, but for some months had to wear a pad to protect the scar resulting from the rejoining of the nerve endings, and I got a slight electric shock when anything touched it.

The manual dexterity needed for these operations is acquired by practice, and the only thing one has to be careful about is not to allow the hand to remain any length of time in the neighbourhood of the molars, either when inserting or withdrawing it, as the animal will very easily push it aside with the tongue and get it between the teeth if allowed to do so. I have only had this one accident in thousands of cases, and I think my experience might be of some use to my brother practitioners.

THE RAT PROBLEM.

By THOMAS PARKER, F.R.C.V.S.

(Veterinary Inspector, and Inspector of Meat, Provisions, etc.,
Newcastle-upon-Tyne.)

THE Brown Rat (*Mus decumanus*), sometimes referred to as the common brown Hanoverian or sewer rat, is larger than the Black Rat (*Mus Rattus*).

It is believed to have made its first appearance in this country in the year 1729, being brought by ships trading with the East. It has now almost superseded the black rat, being not only larger but a more formidable animal. It should be noted, however, that during recent investigations within the London district, both species have been found living in harmony, not only on the same premises, but in the same rooms. Furthermore, on one floor of a factory in Holborn, not only were both species of rats captured, but also specimens of the Alexandrine Rat—the brown variety of the *Mus rattus*, and the black variety of the *Mus norvegicus*.

Fecundity.—Rats commence breeding when six months old and are fully grown a few months later. The period of gestation is about three weeks. They may have several litters in the year, each litter comprising on an average eight young. They are born naked and blind, are covered with hair on the eighth day, and are able to see on the thirteenth day. On the twenty-first day they have reached the size of a mouse, and are turned out to shift for themselves when about six weeks old. It has been calculated that the progeny of a single pair of rats may amount to 800 in one year. It will be evident, therefore, that rats may increase in numbers very rapidly if undis-

turbed and sufficient food is available. Mice breed at six weeks old and are fully grown at three or four months old.

A MENACE TO PUBLIC HEALTH.

Rats may prove to be a real menace to public health in several ways, the chief of which are briefly :—

As carriers and transmitters of dangerous diseases.

By contaminating food and water supplies.

By causing insanitary conditions generally.

Besides the *Trypanosoma lewisi*, a protozoal parasite which is harmless to its natural host and not known as a parasite of man, the rat is a carrier of two other protozoa, namely, *Spirochæta icterohæmorrhagiæ* and *Spirochæta morsus muris*, which are responsible for two serious diseases in man, known respectively as

Weil's Disease or Spirochetal Jaundice ; and

Rat-bite Fever.

Other diseases that require special consideration are :—

Plague.

Trichinosis ; and

Tuberculosis.

1. *Spirochetal Jaundice* occurs in most parts of the world, but most commonly in Japan. It was frequently met with amongst the allied troops in France, the trenches being infested with rats. Although this disease has been conveyed to man by rat-bites, it is probable that contaminated food and water is the most important source of infection.

2. *Rat-bite Fever* has been known for a long time in Japan, and cases of similar illness have been described in this country, the United States of America, and elsewhere. During 1918, rats caught in and about the City of London were examined by Alexander Foulerton, F.R.C.S., for the presence of parasites causing these diseases. Of 101 rats examined, four brown rats were found affected with *Spirochæta icterohæmorrhagiæ*, whilst of six rats examined for *Spirochæta morsus muris*, none were found affected. Whilst it has been clearly proven that rats capable of conveying Spirochetal Jaundice have been found within this country, it would be unwise, on the other hand, to conclude that rats capable of conveying Rat-bite Fever do not exist, simply because six were examined for that disease with negative results.

3. *Plague* is a specific and infectious disease affecting man and some of the lower animals. Between the year 1896 and the beginning of 1905 no fewer than 3,150,000 persons died from Plague in India. With the ending of the great outbreak of Plague in 1664—1679, this country was free for more than 200 years. According to a Memorandum

dum issued by the Local Government Board, outbreaks of Plague have occurred periodically during the past twenty years at several of our ports, and, in view of these facts, Sanitary Authorities are advised to be always on the alert, and especially for ascertaining the cause of any recognised excessive sickness in rats, or of human illness of a doubtful nature associated with sickness or mortality in rats in the same district.

As rats are subject to Plague, and are often killed by it in great numbers, they are the most dangerous of all animals so far as the spread of the disease and the creation of new centres of infection are concerned.

It should be remembered, however, that fleas form the intermediaries between the diseased rat and man. When rats are dying of plague their blood is literally swarming with the bacilli of that disease. Fleas feeding on plague-infected rats get plague bacilli on to their mouth parts and myriads of them are, of course, sucked up into the stomach with the blood. Those on the proboscis may be transferred directly to the next victim that it is thrust into, and those in the stomach may be carried for some time and finally liberated when the flea is feeding again or when it is crushed by the annoyed host. In fact, the latter is probably a common method of infection, for the bacilli that are liberated when the flea is crushed may readily be rubbed into the wound made by the flea bite—or into abrasions of the skin due to the scratching. A useful hint to remember would therefore be—Kill the flea, but don't "rub it in."

The rat flea (*Ceratophyllis fasciatus*) occurs on both the brown and the black rats, on the house mouse and frequently on man.

The common human flea (*Pulex irritans*), although regarded primarily as a pest of human beings, often occurs very abundantly on cats, dogs, mice and rats, as well as on some wild mammals, and occasionally on birds.

The dog and cat fleas (*Ctenocephalus canis and felis*) are very often troublesome household pests besides being frequently found on rats.

Fleas usually leave rats as soon as they die, and, of course, seek some other source of food.

Furthermore, human fleas bite rats, and fleas found on dogs and cats bite both human beings and rats. Again, as human fleas and fleas found on cats and dogs can live on rats as casual parasites, they are able, therefore, to play an important part in the transmission of plague from rat to rat or from rats to human beings and *vice versa*.

4. *Trichinosis* is a disease of man and animals caused by a parasite—small worm hardly visible to the naked eye—called the *Trichina Spiralis*.

Human beings acquire the disease by eating the flesh of infected pigs, and pigs become diseased through the agency of trichinous rats.

The infected flesh contains larval *Trichinæ Spiralis*, and when it is eaten by carnivorous animals the larvæ are set free from the muscle by the action of the digestive juices. When they reach the intestines they become adults and sexually mature. Each female gives birth to a large number of embryos. Some of these are excreted in the fæces, but most of them are carried to the muscles in the blood stream. The embryos, which invade the muscles, become coiled up and surrounded by a cyst wall formed by the tissues, and they remain alive in this situation for a considerable time. Animals may be infected not only by eating the flesh of other infected animals, but also by consuming other food which has been soiled by fæces containing the larval forms. It will be readily understood, then, how pigs may infect each other through their fæces. It should be borne in mind, however, that probably the main factor in the up-keep of *Trichinæ Spiralis* is the rat, for these animals are very easily infected, and are not infrequently, in nature, harbourers of the parasite. Again, as they commonly exist about piggeries, they may soil the food of the pigs with their excretions while the parasites are in their intestines, or they may be eaten by pigs, and so give rise to disease in the latter animals. As an illustration of how human food may become contaminated with the active elements of this most repulsive disease through the agency of rats, the following case will suffice :—

In February, 1909, at Exeter, two persons who had consumed some salted pig's flesh became seriously ill. One of them, a labourer, was thought by his medical attendant to be suffering from trichinosis. A specimen of the salted pig's flesh was then sent to the Veterinary Department of the Board of Agriculture, where it was examined and found badly infested with *Trichina spiralis*. On making inquiries at a farm it was found that the flesh had come from a sow which had been ailing for about two weeks before it was slaughtered. Although the sow was in good condition and fed well, she had shown great difficulty in using her hind quarters, so much so, that she had even to be assisted to rise. On this account she was slaughtered, pickled, and used for food. On making further inquiries the farm premises were found to be overrun by rats. One of these was secured, and upon examination its abdominal muscles were found to contain a very large number of trichinæ. Small pieces of the abdominal muscles were then—for experimental purposes—fed to a white rat, which died four days after eating the diseased flesh. On examination adult trichinæ were found in the intestines. These intestines were

fed to another rat which also died four days later. Adult trichinæ were found in its large intestine. The carcass and intestines of this rat were then fed to three white rats. The carcass was freely eaten, but the intestines appeared not to have been touched. Seventeen days later two of them were found dead, and in the muscular parts of the diaphragm of one of the latter encysted *Trichinæ spiralis* were found.

It would appear perfectly clear, therefore, that not only did the muscles of the rat secured at the piggery contain living trichinæ, but that it was highly probable that the sow became infected through the agency of diseased rats on the premises.

5. *Tuberculosis* of the rat, sometimes termed rat-leprosy, is a chronic infective disease which has been found to exist in five per cent. of rats specially examined in Odessa and Berlin. The disease has also been described as existing in rats in this country. The exact relationship between rat tuberculosis and forms of tuberculosis amongst other animals is uncertain, but it is believed to resemble tuberculosis of birds more closely than any other variety.

Pseudo-tuberculosis is the term applied to another disease—highly infective—which exists as affecting the rat. In fact, in 1916, an outbreak occurred amongst trench rats in France, a considerable number becoming infected.

As the rat possesses a high degree of immunity against the micro-organism causing the common form of human tuberculosis, it is conceivable that the human subject may—in a similar degree—possess natural immunity against the so-called rat tuberculosis.

It has been definitely established, however, that human beings do suffer from the same form of tuberculosis as found in cattle; and by experience one is aware of the fact that not only healthy, but also tuberculous carcasses and organs, whilst hanging in private slaughterhouses, are commonly overrun by rats. These rodents often cause serious damage to healthy carcasses; but when they are overrun and eat into tuberculous material and, having got their limbs, etc., well contaminated, pass on either to a healthy carcass with the same or adjoining slaughterhouse, or to some part of the district, perhaps a dwelling, the possibilities of spreading disease are by no means negligible.

HUNGRY RATS ARE FEROCIOUS.

Many years ago, a vessel, carrying cattle to this country, was wrecked off St. Mary's Island on the North East coast. Some weeks later a number of workmen had occasion to visit the vessel. Not long had they been on board when large numbers of long lean rats

made their appearance and attacked the men. The latter took refuge up the rigging and finally had literally to fight their way overboard and make their escape by rowing from the ship "for all they were worth."

The late Mr. R. Stephenson, M.P., related a peculiar affair. In the Walker Colliery, in which many horses were employed, the rats had accumulated in great multitudes. It was customary at holiday times to bring to bank the horses and fodder, and to close the pit for a time. On one occasion, when the holiday had extended to about a fortnight, during which the rats had been deprived of food, on re-opening the pit the first man who descended was attacked by starving rats, and speedily killed and devoured. Other peculiar instances are on record, including one where patients in hospital at Gocrito, Trinidad, suffering from leprosy, had their toes eaten off by rats. The rats seemed to know that the patients were too weak to defend themselves against their attacks.

DAMAGE DONE BY RATS.

It has been estimated that the damage done to foodstuffs alone amounts—in value—to no less than £15,000,000 annually. If to this were added the amount of loss through destruction of articles of various kinds, other than foodstuffs, the total sum would be enormous.

Goods stations and other railway premises, docks, wharves, cattle and pig lairs are all frequented by rats. In town and country alike, and in towns in particular all the year round, they frequent common sewers, hen runs, allotments, market gardens, dwellings, shops (butchers, grocers, fish, confectioners, fruiterers, &c.), bakehouses, cafes, wholesale meat establishments, slaughter-houses, triperies, warehouses, granaries, flour mills, paper mills, large stores, workshops and factories, sewage farms, scavenging tips, knackeries, marine stores, hotels, fancy goods and millinery establishments and other premises too numerous to mention. In town and country rats frequent rubbish heaps in search of food and occasionally migrate from such centres in large numbers. On farm premises corn, cattle food, potatoes, and other kinds of foodstuffs are destroyed. Even chickens and young ducks are carried off. By burrowing beneath and in close proximity to buildings, rats frequently let down the drains, thus bringing about open joints and other insanitary conditions. In search of water, pipes are gnawed through, causing leakage and the flooding of premises. Woodwork within dwellings, offices, warehouses and buildings of every description receives particular attention. Walls may be riddled until the building is simply honey-combed. Within butchers' shops, during the night, rats will

climb down the iron rods until they reach suspended quarters of beef and cause an immense amount of damage by eating into the fleshy parts. In drapery and house furnishing establishments, the annual damage amounts—in various instances—from £50 to £250 ; in fact, ten or a dozen fur muffs may be destroyed within one night, and curtains, ladies' hats, towels, blankets and other soft goods are known to be destroyed regularly. The hair seating of chairs is sometimes gnawed through and the stuffing removed, presumably for the purpose of nest-making. It must be remembered that the foregoing are only a few samples of the innumerable kinds of foodstuffs and articles damaged. A precise list of material damage caused by rats would, undoubtedly, be most startling.

PREVENTIVE MEASURES.

Whatever measures are adopted against rats—by way of prevention—those that are calculated to make it impossible for them to obtain food and water should be considered as being the most important. Animal foodstuffs used in stables, byres, kennels, poultry farms and other premises should be kept in metal or sheet iron bins.

Ricks surrounded by five-and-a-half feet high galvanised iron sheetings dug two-and-a-half feet into the ground are effectually protected. Another method is to build them on stone piers surrounded by a wide inverted pan or saucer-shaped rim of tin sheeting ; the piers should be three to three-and-a-half feet high with the protecting rim near the top. Other buildings are difficult to repair, but where possible, iron sheeting, brickwork and cement should be used. In some cases it would be impossible, short of rebuilding, to render premises rat proof. In piggeries and poultry runs, the animals should be fed, where possible, in the presence of attendants, care being taken to remove all food-stuffs not required.

Refuse must not remain unprotected within the yards of private dwellings. All vegetable matter, bones or other such unusable waste foodstuffs should be burned, and ashes kept within properly covered receptacles.

No waste foodstuffs of any kind should be thrown indiscriminately into the back streets for the purpose of feeding stray dogs. Similar precautions particularly apply to those in charge of cafés, restaurants, hotels, and shops of various kinds. It matters not whether it be within a theatre, picture hall, railway carriage, railway station, office, work room, tea room, warehouse, workshop, factory or any other place where small or large numbers of people have their meals. It should be considered as a public offence either to throw pieces of biscuit, bread, fat or other waste food on to the ground or leave such

articles lying about. Any such waste material as cannot possibly be utilised should be carefully disposed of by burning. Within slaughter houses and other places, garbage and refuse should be kept until removal for destruction within properly constructed galvanised iron receptacles. Everything possible should be done to remove rubbish heaps. Within stores of every description the contents should be moved as frequently as possible, and within large warehouses packages should be so arranged as to reduce the privacy of the rodents to a minimum. Burrows from which rats have been driven or which lead to others may sometimes be successfully intercepted by being filled with a mixture of cement, sand and broken glass or crockery.

It is highly essential to have defective drains attended to, and wherever possible old or disused drains should be removed. As vessels arriving at the various ports are almost certain carriers of rats they should be dealt with as soon as possible on arrival. Another matter requiring careful attention is the protection of natural enemies of rats and mice. These include owls, hawks, buzzards, ravens, stoats and weasels.

REMEDIAL MEASURES.

Before referring to the various measures to be recommended for immediate application it will, perhaps, not be out of place to briefly describe a method which has for its object extermination by directly opposing the ordinary laws of nature. It is known as the "Rodier" method.

Bearing in mind the number of young in each litter and the number of litters produced within a year, it is believed that were a scheme adopted which would, in effect, with certainty gradually reduce the number of females, success would be assured, for it is almost certain that the time would arrive when the males would co-operate in completing the process of destruction. Rodier claims that by the present methods more males are caught than females, with the result that those not caught live in a polygamous state. Because of being polygamous, the females are more prolific than they otherwise would be, and produce more females than males. The way to exterminate rats is to make and keep them polyandrous, that is, the males in excess to the females; and the way to do this is to catch the rats alive and uninjured, kill the females and liberate the males. When this is done, the males will persecute the females that are not caught, and thus prevent breeding. They will also kill the newly born, and when they largely exceed the females in numbers they will worry the remaining ones to death. By this means all the females will be exterminated,

and the males remaining will finally die of old age. The greater the excess of males the quicker the extermination.

To put into operation such a scheme, it would be necessary for all rat infested premises to be thoroughly equipped for the purpose of catching rats alive and uninjured. Furthermore, large numbers of rat-catchers would have to be employed to regularly visit such premises for the purpose of separating and killing the females and liberating the males.

Again, it would be equally essential for all districts to be operating continuously in the same direction. Otherwise, having regard to the migratory habits of the rodents, the scheme would be hopeless. Were it shown that destruction by baiting accounted for as many females as males, then providing the "Rodier" method were found practicable of universal application, a combination of the two methods would be well worth consideration. Before considering the application of any such scheme, however, it would be desirable that the probability of its success should be thoroughly investigated, not only by specially designed experiments, but also as to whether its application could be properly maintained throughout the country. In the opinion of the author, even were the method proved theoretically correct, it would probably fail for want of co-operation, for there are few people who either care to handle rats, detain them on their premises alive or liberate those already secured.

The methods of destruction may be described under the following headings, namely :—Baits, Poisons, Gassing, Trapping, Hunting, and Virus.

BAITS.

It is commonly believed that faint traces of the oils of rhodium and aniseed attract rats. It has been proved, however, that instead of improving the bait they have the contrary effect. And of all the baits tested, the one that has been found most readily accepted is dry bread. The tastes of brown and black rats have been found to be practically identical, and the following table will serve to illustrate the merits of the various foodstuffs used as bait in experiments carried out within the Zoological Gardens, London. The percentages given are based on the ratio between the attractiveness of the various baits and plain bread—the favourite food, which is represented by the figure 100 :—

Bread (plain)	100	Malt	20
„ (faintly flavoured		Maize	20
with Rodium) ..	40	Dripping	20

Bread (faintly flavoured		Cabbage	20
with aniseed)	30	Potatoes (mashed with	
„ (soaked in milk)	60	milk)	20
Oatmeal	80	Lard	10
Tallow	70	Bacon	10
Banana	60	Beef extract	10
Flour and water	50	Lentil meal ;. ..	10
Oats	50	Fish (fried)	10
Barley.	50	Raw meat	0
Tripe	50	Sugar	0
Bloater paste	30	Apple	0
Fish (smoked)	20		

Notwithstanding the preference for certain foodstuffs—used as bait—as indicated by the table submitted, no hard and fast line can be laid down to suit all conditions, for rats, like many other animals, may under varying circumstances differ in their tastes. For example, quite recently the author tested the most favoured and one of the least favoured baits—as found by the London tests and illustrated in the table—namely bread and meat. The bread was plain and the meat was minced. Each was mixed with barium carbonate. They were both laid down at the same time and place in the evening, and on making an inspection the following morning it was found that the meat bait had all been removed whilst the bread bait remained untouched. Again, where, after a while, the bait is refused, a change should be offered.

POISONS.

Phosphorous, Arsenic, and Strychnine are often used in the preparation of rat-pastes or vermin killers, but, as they are all rapidly fatal in their effects on man and the domestic animals, and therefore dangerous, are not recommended. There are others which, whilst being rapidly fatal to rats, are comparatively harmless to domestic animals. These are Barium Carbonate and Squill.

Barium Carbonate.—Although $1\frac{1}{2}$ to 2 grains suffices to kill a rat, barium carbonate is more or less harmless to domestic animals, cats and chickens withstanding 10 to 15 grains, and an average-sized dog over 100 grains. It has also the advantage of being cheap, tasteless, odourless, and therefore easily made attractive by mixing with a suitable bait, and has been found to be as effective as the more dangerous poisons, such as phosphorus and arsenic. The bait may be prepared in the following manner :—Make a paste by well mixing equal parts of the powdered barium carbonate and tallow-fat or dripping and spread it over thin slices of bread exactly as one would do with butter. Then, having firmly pressed the slices together to form sandwiches, they are cut into small squares ready for use. Of

course, it may be mixed with any other bait found equally or more acceptable. Owing to the action of barium carbonate on the lining membrane of the stomach the rats are induced to leave their holes in search of drink. It is recommended, therefore, to place within reach, on the day following the treatment, shallow bowls containing a solution consisting of equal parts of liquid squill and milk; the rats being thus made to partake of more poison in their efforts at relief.

Squill may be obtained either in the form of a powder or of a solution. Although comparatively harmless to domestic animals it is extremely toxic as far as rats are concerned, the minimum lethal dose being only half a grain. Mix the powdered squill with tallow or dripping, or with either of these fats and oatmeal. The mixture should be smeared on bread, the latter being then cut into small pieces. In the liquid form squill may be prepared for use in the following manner:—Mix equal parts of liquid squill and milk, and to each pint of the solution add one pound by weight of bread.

Of all rat poisons, squill solution is believed to be the most effective, and has been recommended in preference to Barium Carbonate for the following reasons:—

(a) It is three times as toxic for rodents.

(b) It is even less harmful to most domestic animals. The one point against the use of squill, however, lies in the fact that at present it is somewhat more expensive than most other poisons.

There is always a possibility of a rat dying under flooring or behind wainscoting, either through poison or otherwise. If a rat from a drain takes poison, and cannot regain its habitation, the carcass will most probably become putrid. If such a rat dies near a fireplace or hot water pipe, the stench will be intensified. Chloride of zinc is a good deodoriser in such cases, and combines with and neutralises the offensive chemical products of putrefaction. If necessary, a hole should be bored with a bit and brace in the vicinity of the supposed source of origin of the odour, if possible. Some perfume or pine-wood oil can be added to the zinc chloride, which should be applied through the hole. A cork will close the orifice, and can be withdrawn from time to time to ascertain whether the nuisance has abated. Where possible, however, it is advisable to remove the carcass immediately its presence has been detected.

GASSING.

Of all the methods advocated, gassing, under certain conditions, is the quickest and most certain for destroying rats on a large scale. When employed in buildings or other places where the runs are not easy of access, gassing has the advantage over all others in that it kills not only the adults but also the young or newly-born in their

nests. The most suitable gas to employ, and the one recommended, is sulphur dioxide.

Sulphur dioxide is a heavy gas and may be prepared by burning sulphur in air or oxygen. It is non-inflammable and has a pungent, suffocating odour. It is comparatively cheap to prepare and is quite harmless to man and the domestic animals when inhaled in small quantities. When sulphur dioxide gas is driven into rat holes under pressure the whole network of runs is permeated in a few seconds, making the existence of the rats underground impossible. Although many of the rodents escape only to die in the open, some no doubt recover. The gas kills many of the rats by immediate suffocation, whilst those that escape into the open die from acute congestion of the lungs. To secure rats bolting from the runs, the co-operation of a dog is desirable. For the destruction of rats on board ship the method just described may be strongly recommended; and, no matter whether employed on land or ship, the fact that sulphur dioxide gas is a disinfectant as well as a deodorant may be considered an advantage. For rat destruction on board ship sulphur candles have been employed with success by the Port of London Authority. Probably the most successful means at our disposal for using sulphur dioxide gas is an apparatus manufactured by the Clayton Fire Extinguishing and Disinfecting Company, Limited, London. The Clayton machine is provided with a generator in which the gas is made and driven through a hose by means of a powerful blower.

Two other bodies may be employed for causing rats to leave their runs when hunting along hedgerows or in old farm buildings where the runs are within thick walls:—

Carbon disulphide is a colourless, heavy and extremely volatile liquid. It may be employed by soaking wadding, cotton waste, or some such material, and placing the latter into the hole and then immediately covering the hole in. In this way the vapour is allowed to permeate the runs. As the vapour of carbon disulphide is highly poisonous it must be used with caution, and no light or smoking should be allowed during its application.

Acetylene is a colourless, rather heavy gas, having a peculiar, unpleasant odour. It is made by decomposing calcium carbide with the aid of water. When employed along hedge rows, pieces of calcium carbide within tow may be placed within the entrance of the run, then after saturating with water the entrance is quickly closed in with pieces of turf. Owing to acetylene being not only highly poisonous, but exceedingly explosive, great care must be exercised as to its application, which should not be within buildings.

TRAPPING.

There are numerous kinds of cage and other traps on the market, most of which are more or less successful. Probably the most successful type is the *Brailsford Trap*. It consists of a long, narrow wire cage with doors at each end, which, when the trap is set, remain open, having a direct passage through. A platform in the centre, where the bait is placed, is connected by a spring which, when trodden upon, releases the doors, imprisoning the rat or rats. It has been found that the trap 8 inches high gives by far the best results.

The Mysto Trap consists of a metal structure connected with a tank full of water. The bait is placed just inside the door, which closes on the entry of the rat. In order to effect its escape the rat climbs up the cage to a hinged platform, which collapses, precipitating the rodent into the tank. The collapse of this platform automatically opens the door of the cage, and the next rat is thus enabled to enter and repeat the performance.

Barrel Trap.—This may consist of a barrel, the upper and open part being covered with brown paper which is cut crosswise over the middle. The bait is suspended by a thin wire immediately over the centre or where the cuts intersect. The rat in attempting to reach the bait is suddenly precipitated into the barrel.

Amongst other traps successfully employed are the ordinary cage trap with bait hook, and with a platform connected by a spring with the door; the steel gin trap, a type generally popular with the game-keeper; and break-back traps.

HUNTING.

Hunting with dogs and ferrets is a method generally employed in country districts, about farms, hedge-banks, and other places.

VIRUS.

It would appear that in many cases the use of virus has proved very satisfactory, in some fairly satisfactory, and in others distinctly disappointing. It is probable that in some cases, owing to improper exposure, the virus loses its virulence.

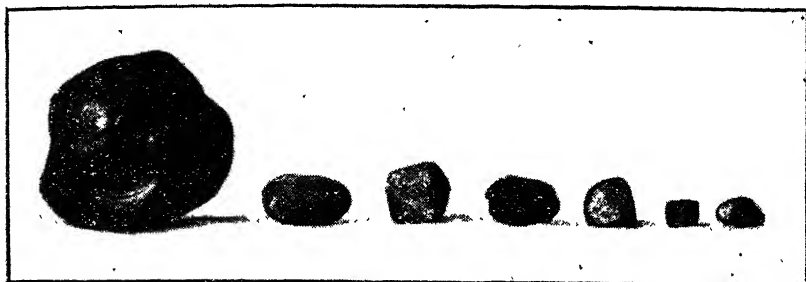
Further, it is possible that in some cases hasty conclusions have been arrived at before the disease, if conveyed, has had time to incubate and declare itself. Again, as in other diseases, it seems probable that many rats possess a certain degree of natural immunity and are not affected, whilst many that are affected receive the disease in a mild form, gradually recover and thus acquire a certain degree of immunity or protection against a second attack. Finally, the warning as to the use of poisoned baits applies equally to the employment of rat viruses, that is to say, it is important to avoid contamination by the virus of any material likely to be used for food.

GALL STONES.

By EDWARD MORGAN, M.R.C.V.S., D.V.H.,
Puerto Cabello.

Subject.—A six years old Venezuelan steer (Sp. Novillo). On ante-mortem examination the animal appeared perfectly healthy, and was in good grass-fed condition for beef purposes.

Post-Mortem.—The boy who was trimming the livers noticed something unusual in the gall bladder, and on cutting through with his knife, a huge-sized gall stone dropped to the net used for collecting them. There was also one small flattened faceted gall stone in the bladder. The large one weighed exactly eleven ounces, and was eleven inches in circumference. It was of the usual brown colour. Its surface was fairly smooth, and faceted at one small area, where the smaller one had wrought its form, as seen by the illustration.*



Gall Stones.

Owing to its abnormal size, there could have been but slight movements of the stone inside the bladder. Seeing that the smaller one was confined to one particular area was a proof that a great deal of pressure was exerted from the bladder wall. The liver was diseased with spotted capillary angiomas, which disease is prevalent in the bovine livers of this country. There were no flukes present. The organ was of an average size and weighed about $9\frac{3}{4}$ lbs. The carcass, apart from the liver, appeared healthy and in good condition throughout. Seeing that the gall bladder was in such an abnormal state, one would have surmised the presence of jaundice.

Gall stones are prevalent in the Venezuelan cattle ; as a matter of fact, South America is considered by the Chinese and Japanese as one of the best countries for supplying them with these valuable

*In the above illustration the large gall stone is the one described in this article, where the facet is noticed. Unfortunately, the smaller one was mislaid. The others are illustrated for comparison only.

Reference : Scherington's Physiology Notes ; Clarkson and Farquharson, Physiology.

essential constituents from which they extract dyes for painting their china-ware. These biliary calculi are met in various shape and structure, as illustrated—spherical, oval, angular, flattened, and with smooth or roughened surfaces, and if there are more than one present, are more often than not faceted. Should a single faceted stone drop into the net, the liver trimmer knows that there are more to be found, either in the gall bladder or biliary tubules. Beads of faceted gall stones are often found in the latter, and the majority are cubical in form, and faceted on the six surfaces, apparently the result of a certain amount of rolling movements taking place before entering the gall bladder. The presence of such large quantities of gall stones in the biliary tubules appears to be conclusive that the evidence given by some members of the R.C.V.S. at courts of law were erroneous and misleading, when expressing the opinions that owing to the fact of the absence of a gall bladder in the horse, there can be no gall stones present in its liver. The majority of the small-sized cubical gall stones are found in the biliary tubules of the liver of the ox, and it is quite possible that most, if not all, of those found in the gall bladder nucleated in the tubules. This is only a supposition based on what I witness daily.

The greatest number of gall stones which I saw in one single liver was in that of a horse which Mr. H. Sumner, M.R.C.V.S., demonstrated once at the Liverpool University.

If the same number of equine livers were subjected to the same rigid examination as those of bovines, probably we would hear more often about the presence therein of gall stones.

In a country like Venezuela one would anticipate to find less abnormalities of the kind, where the cattle live in a natural wild state, out on the open vast plains, and are monarchs of all they survey, except when the puma, jaguar, alligator and rattlesnake challenge their rights. Nevertheless, we have reasons to assume that there is deficiency of some essential elements, either in the food or water. The first thing which attracted my attention on the plains was the deep excavations here and there, sometimes deep enough to engulf an average-sized house. The earth from these cavities has been scooped out by cattle, while evidently searching for some earthy salts, which they are unable to obtain in sufficient quantities in the grass and water. They appear like sheep in a root field, with their heads covered with earth, and the saliva drivelling from their mouths. These plains are long distances from the nearest salt water coast. When the cattle are driven down to the frozen meat works, they travel the last few miles along the sea-coast, and here they lick the earth on the road-side, and often eat noxious grasses and herbs, such

is their craving for salt. We often see cases of acute gastritis, sometimes as many as 50 per cent. of the paunches contain such lesions. One will naturally surmise the above as the direct cause of such acute lesions. The seasons are two here, viz., six months of dry weather, or drought, and six of wet weather, or rainy season. During six months of the year the cattle have to accumulate a store of fat so as to resist the lean six months, when the grass dies up, as well as most of the streams, and cattle have to search for water from stagnant pools, which are often foetid. In the spring months of the year the majority of the livers contain liver flukes.

I mention the above conditions as it may assist some keen observer to get nearer solving the question of the cause of gall stones, which are more prevalent in some countries than others. Physiologists admit that the whole story of metabolism is far from being plain, but that we get glimpses here and there of the changes which the food undergoes, and that from these we must patch a history as well as we can. It is apparent that a large proportion of the food passes through the liver on its way to the general circulation, and that metabolic changes take place in this organ.

It has been proved that animals rapidly die if they are fed with food from which the salts have been extracted. They exhibit symptoms of weakness and general disturbance of the nervous system, often leading to convulsions.

Gall stones are composed of bile pigments, such as Biliverdin, which gives the green colour to herbivorous bile, and occurs in the urine in jaundice. Cholesterin is also often present in great quantities in gall stones, also calcium, in combination with other ingredients, such as carbonates and phosphates.

It has been suggested that the presence of parasites are a cause of gall stone formation, such as the liver fluke, also the presence of *Bacillus coli*; excess of salines, undue retention of certain fluids, fermentation, etc. In human beings diseases of the gall bladder is common in the tropics, and acute and chronic inflammations. Gall stones are often met with and are considered as sequelæ to typhoid fever, and also arise from other causes.

Physiologists state that there is a close relationship between the blood and bile pigments. Evidences that the bile pigments are derived from the hæmoglobin of the blood are conclusive, and now generally accepted. If free hæmoglobin be injected into the blood-stream, the pigment of the bile is increased in quantity and appears in the urine.

From the veterinary inspector's point of view, as an individual, the synthetical is more interesting than the preventative, due to the

fact that pathological specimens are supposed, for obvious reasons, to be his property. The present price of £30 (thirty pounds) a pound is a great temptation to reduce the reserved collection almost to a minimum, and convert it into gold. A gall stone like the subject of this article is worth over £20 in the Japanese market.

Biliary calculi are said to cause colic and great pain during their passage through the bile ducts. Also when the escape of bile from the gall bladder is hindered by obstruction of the common bile duct, re-absorption of the biliary constituents from the interlobular ducts of the liver takes place into the lymphatics surrounding them, leading on to jaundice. It is remarkable that of the hundreds of cattle which we examine here almost daily, and, as already stated, a great number of them contain gall stones, I have hardly ever met a case of colic amongst them, and very few cases of jaundice.

AN INTERESTING CASE OF MULTIPLE SARCOMAS IN A STALLION.

By FREDERICK HOBDAV, F.R.C.V.S., *London*, AND GEORGE HARRIS, M.R.C.V.S., *Sawbridgeworth*.

THE subject was a valuable Shire stallion, 4 years old, which had for some months been observed by the owner to groan when passing fæces, and had lately begun to lose muscular condition on the back and quarters. Affairs were brought to a climax by the formation of a hydrocele involving the whole of the scrotum. This was "tapped" but, as was surmised at the time, reformed in a few days.

It should have perhaps been mentioned that when the colt was ten weeks old it had a very severe attack of strangles, and only pulled through by the most assiduous care in regard to nursing and artificial feeding.

As the groaning increased and the colt began perceptibly to fall away, the owner decided to have the animal destroyed.

Post-mortem examination revealed the abdomen to be absolutely full of greyish white tumours varying from the size of a walnut to a half-quartern loaf, the pelvic cavity being one huge mass. Sir John MacFadyean, who very kindly examined several of the specimens, declared them to be sarcomas.

AN OBSERVATION ON THE CASTRATION OF FARM ANIMALS.

By FREDERICK HOBDAV, F.R.C.V.S.
London.

RECENTLY I had the opportunity of watching the castration and spaying of some farm animals by a practitioner in the Eastern Counties, and although I know that the time taken is nothing very

extraordinary, I also know that only a comparatively small proportion of our present-day college students have ever seen such demonstrations of dexterity. We ought not to have the idea that such are beneath our notice, as, if so, these operations are allowed to become the nucleus of the unqualified practice of the quack, who gains his foothold in a district by their expert performance.

The first batch was one of eight male pigs, each 7 weeks old, all of which were caught by a farm hand and disposed of within three minutes, the actual operating part taking 61 seconds; an average of less than 8 seconds each. Three were timed at 4 seconds each. Four female pigs of the same age averaged 40 seconds each from the moment the incision was made in the flank until the wound in each case was sutured.

In each case afterwards the animal walked away apparently quite unconcerned.

A six-weeks-old male calf took 35 seconds, and a two-year-old colt, with the help of one farm hand only, took 2½ minutes to place the clams on and remove the testicles.

RUPTURE OF THE ŒSOPHAGUS AND RIGHT AURICLE IN A DOG.

By W. S. HARRISON, M.R.C.V.S.
(*Hertford.*)

THE subject was a small Pomeranian dog, recently brought to me for examination, the owner submitting the following particulars relating to the case. "At eleven a.m. the dog accompanied me to a butcher's shop and was noticed to be eating something, which was apparently swallowed. On returning home he appeared somewhat uneasy, and occasionally coughed, but soon assumed his normal condition." During the evening the circumstance was mentioned to one of her sons, who had returned from London, where he is attending a course of study in one of the medical schools. She arrived at the conclusion that some obstruction had been, or was, located in the œsophagus. Then it was determined to send the dog to me for more exhaustive investigation. After careful external manipulation, and observing that all the ordinary urgent symptoms of choking were absent, I expressed the opinion that the obstacle had become dislodged, and then my attention was directed to the cartilages forming the larynx as being the enlargement supposed to exist. Having explained this as being perfectly natural, I placed my finger into the mouth, and well down the pharynx, and, subsequently, to thoroughly satisfy her, introduced a probang, which passed with the utmost ease, and no resistance on the part of the animal, into the stomach. The dog

remained for half-an-hour without showing the slightest sign of discomfort or uneasiness, and was taken away with instructions that all food, with the exception of a little milk and water, should be withheld until the following day.

Having occasion to pass the owner's house the following morning, I made enquiries and was informed that my patient appeared perfectly well, and had been running about the house and garden as if nothing had happened, and on seeing the animal this statement seemed to be perfectly correct.

Two days later I was in attendance upon some cats belonging to a lady who accompanied the owner of the dog to my house, and was greatly surprised on being told that it died the evening *after* I had seen it.

Thereupon I made another call, and gained the information that the dog maintained his good condition throughout the day until nine o'clock, and was then seized with a severe fit of coughing, uttered a loud yell, and immediately expired.

Having obtained permission to make a post-mortem examination, I found all the contents of the abdomen perfectly healthy and free from the slightest stain, the stomach containing a small quantity of semi-fluid food. I then opened the thorax by dividing the cartilages on both sides of the sternum, and discovered the whole cavity filled with coagulated blood. When a portion of this was removed, I noticed a piece of white matter about an inch and three-quarters long and five-eighths of an inch in diameter, composed of fibrous tissue, and evidently a portion of tendon cut from the extremity of a muscle; the chest was then washed out with water flowing from a tap, and the remaining viscera carefully taken out, when I found the œsophagus, pericardium, and right auricle of the heart ruptured.

And now the question arises: When did these lesions occur? Personally, I do not think the laceration of the œsophagus was caused by introducing the probang, or I should have noticed some resistance at the time, and the animal would have displayed some signs of injury before the expiration of twenty-four hours. It is obvious that the rupture of the pericardium and auricle only took place *immediately* before death.

URETHRAL CALCULUS IN A PONY—OPERATION AND RECOVERY.

By GUY SUTTON, F.R.C.V.S., AND HAROLD STAINTON, M.R.C.V.S.
(London).

THE ability of a calculus to assume the shape and function of a valve is well illustrated by the enclosed specimen recently taken from an aged polo pony gelding.

The owner and groom had repeatedly noticed that micturition was performed with distinct interruptions and agitation of the accelerator muscle.

On July 20th, the pony was driven about 16 miles in a tub cart, and on return failed to urinate satisfactorily. During the next thirty-six hours straining was frequent, but only resulted in a few drops of urine being passed. On entering the box the clinical picture was diagnostic of urinary obstruction and the calculus could be distinctly felt about four inches below the ischial arch.

An emollient of belladonna extract was introduced into the urethra by aid of a catheter and hyocyamus was given in a draught in the hope that the "body," having already passed the ischial bend, might be ejected.

Only slight relief was obtained and no displacement could be discerned. Surgical removal was now urgent and the owner readily gave consent for operation. A rectal injection containing gr chloral hydrate was given, and after an hour's interval the patient was cast and secured on its back without much resistance. An incision over the prominence carried into the urethral canal exposed the stone, its removal being facilitated by a flush of urine. The wound area was painted with iodine solution and the pony allowed to rise. On entering his box he passed a further quantity of urine through the wound. The latter had closed by the fourth day and the pony was sent home at the end of a week. It was driven in harness on the twentieth day subsequent to the seizure.

Translations and Abstracts.

A VOLUMINOUS ABDOMINAL TUMOUR OPERATED ON SUCCESSFULLY.

By JOSE HERRERA.

Veterinary Surgeon of Puerto Real (Cadiz).

A WELL-SHAPED black mule about three years old showed a very large tumour in the abdominal region close to the fold of the right thigh. Agreed with the owner to operate, after fasting the animal; the tumour, as stated, was very big, was nourished by numerous blood vessels, had lived at the expense of the health of the mule, and latterly impeded its movements. Before the actual operation, and to prevent bleeding, dissected back the abdominal subcutaneous tissue, which exceeded in diameter double that of a good milch cow, then proceeded to ligature the veins communicating with the tumour and the anastomosing branches which reached from the mammæ to the tumour and had acquired great size.

Three ligatures were put round the tumour, which was extirpated by using the cautery and bistouri alternately, and during the operation three artery clips were put on, and left on in order to prevent hæmorrhage.

The tumour weighed six kilogrammes (about thirteen pounds). After forty-eight hours the clips were removed and there was no hæmorrhage; daily advancing healing occurred; as a sequel, great inflammation arose, making one fear septicæmia, but fortunately this disappeared slowly in four days, the ligatures were removed from the mammary vein and the other branches which appeared to me to communicate with the external iliac had become obliterated, and the wound cicatrised freely. It was found during the operation that the attachment and situation of the growth rendered it impossible to remove all its root, owing to the considerable danger of penetrating into the abdominal cavity, and rupture from the spirit of the animal. The remains of the tumour were obliterated by means of the detergent powder made by the Arango Company, which gave us a good chance of studying its effect. At the end of a month the operation wound was less than that of an orange, and there was every prospect of complete cure. The case seemed of considerable interest clinically, hence my reporting it.—*Revistade Higiene y Sanidad Pecuarias*.

G.M.

THE OPHTHALMIC TEST FOR GLANDERS: WITH A SIMPLIFIED METHOD OF PROCEDURE.*

During the past few years extensive experiments have been carried on in several countries to determine, if possible, which of the mallein tests would give the most satisfactory results for the general diagnosis of glanders.

According to Mohler and Eichhorn² "In judging a method which would be the most satisfactory for the diagnosis of glanders, various things have to be taken into consideration, but especially the reliability of the test. It should be convenient, the results should be manifested as early as possible, the reaction should be distinct and well marked, and, probably the most important of all, it should be possible for the practising veterinarian to apply the test. The last condition must be seriously considered, since the standing of the veterinarian in the community and the confidence of the public in his work would be more manifest if in suspected cases he could personally decide on the diagnosis instead of having to depend entirely on the results of serum tests made at some distant laboratory."

*Abstracted from an article by D. N. S. Ferry, Detroit, Michigan, in the
"Journal of the American Veterinary Medical Association."

It seems to be the consensus of opinion among most of the authorities, both in this country and abroad, that the subcutaneous mallein test is not as reliable as was first thought and that the ophthalmic test is by far to be preferred.

According to Mohler and Eichhorn² "There is no question but that the subcutaneous mallein test is one of the valuable diagnostic agents for glanders, but no one can any longer deny that failures from this test are more numerous than are desirable. As a matter of fact, the uncertainty of the results from this test caused numerous investigators to seek some other methods which might replace the subcutaneous mallein test. Besides the failures resulting in this test, the technic of execution of the test, together with the time required for the conclusion of the test, makes it unpopular for many veterinarians and sanitary officers."

In favour of the ophthalmic test the following authorities are quoted: Mohler and Eichhorn² "The popularity of the test is rapidly gaining wherever it has been applied, and among its supporters we find at the present time the greatest authorities on the subject of glanders and on clinical diagnosis."

"Its practicability is apparent, and its use in the control of glanders appears to be now an absolute fact." The method was thoroughly tried out by the Bureau of Animal Industry, and from reports in more than 18,000 cases the results from all sources were uniformly satisfactory.

The test has been officially recognised in several of the foreign countries, as well as in Canada and in the United States. In a report of Mohler and Eichhorn² they say, "In the United States the Bureau of Animal Industry, in consideration of the favourable results obtained, has recognised the method of diagnosis for inter-State shipments of equines."

Schnurer, probably the greatest authority on glanders, gives the following report¹⁰:

"During the period 1910-1913, 93,352 ophthalmic tests were carried out in Austria (excluding Galicia and Bukowina); out of these 341 glandered horses gave positive results in 88.8 per cent. of cases, doubtful results in 7.6 per cent., and negative results in 3.5 per cent. Out of 75,879 healthy horses 99.6 per cent. gave negative reactions and 0.34 per cent. positive reactions. The negative results in the glandered horses (3.5 per cent.) are attributable in part to the fact that the horses were not only tested once, or were tested only a few days before death, and probably in part to errors in judgment and mistakes in the post-mortem diagnosis."

He also says (1) "Glanders can be stamped out by the slaughter of clinically affected animals, and of animals recognised as diseased by means of a test. Immunisation is at any rate superfluous.

"(2)—The most satisfactory test is one that does not involve the intervention of a central authority, yields reliable results within a short time (12 to 24 hours) in the hands of persons who are not required to be specialists, is easy to apply and to base a decision upon, is suitable for application on a large scale on the frontiers, can subsequently be verified, and is comparatively cheap.

"(3)—The serological tests (agglutination, complement fixation, precipitation, conglutination, Abderhalden's test and anaphylactic reaction) do not fulfil these conditions either singly or in combination with each other, because they cannot be carried out without the intervention of a central authority.

"(4)—The ophthalmic mallein test (conjunctival reaction) carried out with a reliable concentrated mallein painted upon the eye with a brush, swab, glass rod, or some other instrument, and not dropped into it with a pipette or drop bottle, satisfies all the conditions mentioned."

In the Report of the Special Committee for the Detection of Glanders, mentioned previously, the following may be found: "In deciding upon a method which would be most satisfactory for the diagnosis of glanders, the simplicity and trustworthiness of the method must be above reproach.

"The results should manifest themselves as soon as possible, the reaction should be well marked and distinct and easily applicable by the average practising veterinarian.

"A test with these requirements places a test in the hands of the practising veterinarian, along with which the standing of the veterinarian in the community and the confidence of the public in the veterinarian is brought into closer relationship, in that it enables the veterinarian to personally decide on the results of the test.

"The ophthalmic test not only meets all these requirements, but is without doubt the most convenient diagnostic method at our command.

"Its reliability compares favourably with any of the other available tests.

"The reaction is usually distinct, and doubtful or atypical reactions are rather infrequent.

"The ophthalmic test does not interfere with subsequent serum or other mallein tests if such are deemed necessary.

"The ophthalmic test should be recognised by State and Federal authorities, since its reliability can no longer be doubted.

"In all atypical and doubtful cases of the ophthalmic test the combined complement fixation and agglutination or subcutaneous mallein tests should be utilised for confirmation. Such a procedure should minimise the failures and assure the best results in the control of the disease in a single stable or in an entire community."

A comparative investigation concerning the various biological methods of glanders diagnosis was undertaken, in Russia, by a committee under the direction of Prof. Dedjulin on 245 healthy and six glanders-infected horses, with the following results :

Ophthalmic reaction	0 positive (0% failure in reaction)
Competent fixation method	0 positive (0% failure in reaction)
Agglutination	4 positive (2% failure in reaction)
Subcutaneous mallein reaction	4 positive (2% failure in reaction)
Precipitation reaction	11 positive (5% failure in reaction)

The ophthalmic and complement fixation reactions proved the most reliable methods in healthy horses.

In the infected horses all the methods gave positive reactions.

Dedjulin thus summarises the results of his investigation : "That the malleinisation (ophthalmic reaction) is to be regarded as the most efficient and for practice the most convenient aid for the diagnosis of glanders.

"It apparently yields no more failures in diagnosis than other methods, but it is decidedly simpler, and its execution can take place independently of the laboratory ; this latter is of no little practical significance. Moreover, the judgment of results of this reaction seldom offers occasion for disagreement in opinion."

The writer, in preparing the material for the simplified ophthalmic test, followed the work of Foth⁴, Wladimiroff⁵, Fröhner⁶, Reinhart⁷, Meissner⁸, and others, who used a desiccated precipitated mallein. This was made up by them into a watery solution and used in a similar way to the raw mallein, with like results. Comparing the dry purified mallein with the raw mallein, Mohler and Eichhorn² state that "The advantages of the use of one as compared with the other of these forms of mallein for the eye are not marked, as equally good results were obtained from the application of both forms of this product."

The usual method of preparing the desiccated mallein is to precipitate the raw mallein with several volumes of absolute alcohol, wash the precipitate with ether, and dry *in vacuo*.

Taking this as the point of departure from all preceding methods, the writer moulds the purified mallein with milk sugar, which is a soluble, non-irritating and harmless base, into small tablets, in such a proportion that each tablet shall contain the exact amount of mallein

required for one test. Instead of dissolving the tablet in water prior to its application, as has previously been done with desiccated mallein, the tablet is placed directly into the conjunctival sac at the inner canthus of the eye and there allowed to remain. The tablet will soon (one to three minutes) dissolve without apparent discomfort or annoyance to the animal, and without an irritating effect upon the conjunctiva. The mallein which is thus set free produces typical reactions similar to those recorded as the result of the instillation of the raw mallein, or the solution of the dried mallein.

Soon after this material was first prepared and tested, Meyer, from the Laboratory of the Pennsylvania State Livestock Sanitary Board, reported his results with desiccated mallein, which was the first report on the use of desiccated mallein in this country. Meyer prepared his "Mallein Siccum" by precipitating the raw concentrated mallein with 30 parts of absolute alcohol. The writer, who used a much smaller percentage of alcohol, has found that it is not necessary nor desirable for practical purposes to use as much as 30 parts of alcohol.

Meyer concluded after a thorough test of 210 horses with his desiccated mallein that "The conjunctival test for glanders is very reliable. It can, in a short time, without large expense, be applied by every practising veterinarian and will permit the untrained to make a diagnosis of glanders with the greatest possible accuracy."

The advantages of the method proposed by the writer, for the general diagnosis of glanders, are evidenced by the fact that it fulfils the requirements of a most satisfactory test as suggested by Schnurer, Mohler and Eichhorn and others, while the material itself, being composed of desiccated mallein moulded into a convenient form, is extremely stable, can be handled with impunity and placed directly into the conjunctival sac without a previous solution in water.

REFERENCES of the American Veterinary Medical Association.

- (1)—*Am. Vet. Rev.*, 1913-14, Vol. 44, p. 218.
- (2)—*Bull. U.S. Dept. Agriculture*, No. 166.
- (3)—*Zeit. f. Inf. und Hyg. der Haust.*, 1912, Bd. XI, Heft 5.
- (4)—*Zeit. f. Tiermedizin*, 1911, Vol. 15, p. 401.
- (5)—*Handbuch der Technik, u. Methodik der Immun.*, 1911, Sup. I.
- (6)—*Monatshefte f. Prakt. Tierk.*, 1911-12, Vol. 23, p. 433.
- (7)—*Ibid.*, 1911-12, Vol. 23, page 179.
- (8)—*Centralb. fur Bakt. Orig.*, 1912, Vol. 63, p. 482.
- (9)—*Jour. Inf. Dis.*, 1913, Vol. 12, p. 170.
- (10)—*Proceedings, Tenth International Veterinary Congress, London, 1914. Collected Papers, Research Lab., Parke Davis and Co., 1919.*

THE LONGEVITY OF ADULT ASCARIDS OUTSIDE THE BODY OF THE HOST.*

Wharton† has recorded experiments in which he kept the eggs of the adult common roundworm of man, *Ascaris lumbricoides*, alive in Kronecker's salt solution (physiologic sodium chlorid solution to which 0.06 gm. of sodium hydroxid per litre is added) for from six to twelve days. While I was in the service of the Federal Bureau of Animal Industry, I made some tests to determine the length of time that the common roundworm of the pig, *Ascaris suum*, could survive outside the body of the host. A number of these worms had been collected and thrown into about a 5 per cent. dilution of liquor formaldehyde and left for a few minutes. They were taken out of the formaldehyde and nine of them placed in Kronecker's solution and nine placed in physiologic sodium chlorid solution. The height at which the solution stood when made up was marked on the glass dishes containing them, and once a day distilled water was added to replace that lost by evaporation. The condition of the worms was noted every day except Sunday, and the room temperature noted every day except Sunday from the fifth day to the end of the experiment.

During the course of the experiment, the room temperature ranged from 27.5 to 30 C. (from 81.5 to 86 F.). The last survivor in the physiologic sodium chlorid solution, a male, was alive on the fourteenth day after removal from the host, and was found dead on the fifteenth day. Three females survived for nineteen days in Kronecker's solution; two of these survived for twenty-four days, and one of these was alive on the twenty-sixth day after removal from the host and was found dead on the following day. In another experiment in which ten specimens of *Ascaris suum* were kept in physiologic chlorid solution, one worm was still alive on the fifteenth day. It appears, then, that ascarids may survive for fifteen days in physiologic sodium chlorid and for twenty-six days in Kronecker's solution.

The particular interest which attaches to this experiment is its bearing on a very common idea in connection with anthelmintic treatment. It is quite commonly believed, and the belief is shared

* Abstract from an article by Dr. Maurice C. Hall, Ph.D., D.V.M., in the "Journal of the American Veterinary Medical Association."

† Wharton: *Philippine Jour. Sc.*, 1915, 10, 19.

by many physicians and veterinarians, and is expounded in reputable medical literature, especially the older literature, as well as in the advertisements of commercial houses, that when a patient infested with worms is fasted for twelve or twenty-four hours, the worms become hungry as a result of this lack of food, and that when an anthelmintic is administered, especially when it is given in some such vehicle as milk, the hungry worms will ingest the anthelmintic and thereby become poisoned.

There are two or three objections to such a belief. In the first place, when these worms can survive for twenty-six days in such an unnutritious medium as Kronecker's solution, it is unlikely that they would suffer the pangs of hunger after twelve or twenty-four hours in contact with the collapsed walls of the intestine and the relatively abundant contents of food, epithelial debris and secretions which are still present after such an interval. Moreover, it is known that the digested or partly digested food in the lumen of the host intestine is not the only food of parasitic worms, and it may constitute in some cases a very small part or no part at all. Garin says that nematodes of the digestive tract live at the expense of the wall of the digestive tract in all cases, and not on food in the lumen. According to Garin, some worms (*Heterakis papillosa*) live on mucus and intestinal juices; others (*Oxyuris*, *Ascaris lumbricoides*, *Ascaris suum*) live on epithelial cells; others (*Ascaris rotundata*, *Physaloptera clausa*, *Habronema microstoma*) live on lymphatic cells and lymph; others (*Strongylus*, *Ancylostoma*, *Graphidium*, *Trichuris*) live on blood. He states that the attack on the mucosa may be mechanical (with teeth, etc., as in the case of hookworm) or chemical (by digestive secretions), as in the case of whipworms. Much remains to be learned in this connection, but it is known that such forms should suffer no inconvenience whatever during the period in which the host animal is deprived of food. Finally, it is not necessary to suppose that anthelmintics must be voluntarily ingested by the parasitic worms in order that the worms may be destroyed. It is likely that they are either ingested without volition or that they exercise their lethal effects in some cases by absorption, as may be the case with such volatile anthelmintics as chloroform.

In any case, the preliminary fasting, as well as the preliminary purgation, previous to anthelmintic treatment, is of course a very desirable procedure. But its utility lies in the fact that it removes the bulky food mass which might otherwise protect the worm against the anthelmintic action.

MEDICINE A LA MODE.

Pills and the Leech I sing, of earlier worth,
 When Sawbones were a less instructed lot,
 When drugs were grown on trees or dug from earth
 And the poor field of Medicine in its dearth

Was still a bare and black scene ;
 When pills were pills and Almroth Wright was not,
 When no one bred bacilli in a pot
 (A curious stew, to naked eye inert),
 And having called the net result a vaccine,
 Inserted it in patients with a squirt !

O Turkey Rhubarb, Brimstone, Senna, Squills,
 Names that should be on every infant's tongue !
 What have they done with all those draughts and pills,
 Those simple cures for simple aches and ills ;
 Parrish, the thoughtful giver

Of blushing phosphates for anæmic young ;
 Easton his syrup, and the produce wrung
 From castor oil seeds culled in Asian lands ?

All gone ! The kindly cod still boasts a liver,
 But do they use it ? No. The cry is " Glands ! "

And still more glands, what time the laymen gape

To see the levied tributes grow and grow ;
 Nor guinea-pig nor tomcat shall escape ;
 Nor yet the innards of the ancestral ape

Whose glands are interstitial,
 And, like Medea's cauldron long ago,

Turn hoary eld all youthful and aglow.
 Bring in more pigs and cattle, swell the crop—

A gland's a gland and must be beneficial—
 Till every pharmacy's butcher's shop !

LUCIO.

Personal.

CONGRATULATIONS to Dr. W. H. Dalrymple, M.R.C.V.S., on his appointment as Dean of the College of Agriculture of the Louisiana State University, U.S.A., and Director of the State Agricultural Experimental Stations. The increased duties of this position have necessitated his resignation of the position of Editor of the " Journal of the American Veterinary Medical Association " ; this important

position now being taken by Dr. John R. Mohler, the well-known Chief of the United States Bureau of Animal Industry, Washington, D.C.

IN view of the proposal to hold the next International Veterinary Congress in the United States, our American colleagues seem likely to have an exceptionally busy year in front of them.

PROFESSOR GHISLENI, whose name is well known as a specialist in surgery, has been appointed Principal of the Royal Veterinary College in Turin, Italy.

Reviews.

HORSEMANSHIP IN WAR.

A VETERINARY HISTORY OF THE WAR IN SOUTH AFRICA. By Major Gen. Sir F. Smith, K.C.M.G., C.B., with a Foreword by Field-Marshal Sir Evelyn Wood, V.C. (London: H. & W. Brown, 20, Fulham Road, S.W. 10s. 6d.)

In an Army Order of April 11, 1900, Lord Roberts wrote :—

“The success of military operations in this country (*i.e.*, South Africa largely depends on the mobility of the horses employed, and this ceases as soon as the horses fall into bad condition.”

Yet by no previous writer, by no member of a Commission or a Court of Inquiry, have the reasons for the lack of mobility of the horses in the South African War been fully investigated. This book is the first in which the subjects of study are the conditions which led to a “series of horse disasters without parallel in war,” in other words, this is the first book which, in seeking to explain why the war was so prolonged, and why our failures were so many and so costly, does not beg the question.

The work is divided into three parts. Part I (Oct. 1899 to Dec. 1900) shows why the cavalry had completely broken down by the time Kroonstad was reached on the way to Pretoria. Part II (Jan. 1901 to May 1902) deals with the period of the guerilla warfare, which, from the nature of the operations, was a period of dreadful wastage in horseflesh. Part III deals with technical questions.

The material is derived from the diaries and notes of several veterinary officers; the co-ordination is effected by General Smith's clear and complete understanding of the whole campaign. The exactitude of the work is equalled only by its clarity, sincerity, and most refreshing frankness.

The author considers that by the time we had reached Kroonstad the cavalry was finished; that there should have been made at Bloemfontein a halt of sufficient duration to enable the horses with the troops, and the remounts which were immediately to be issued to them, to be conditioned. The monthly wastage would have been not 28 per cent., as it was, but 8 per cent.

" Briefly, had we conditioned and fed our horses well, the miserable and shameful toll of waste during the year 1901 would never have occurred." Had the veterinary officers been consulted, had their recommendations been given effect to *early* in the campaign, the war would have undoubtedly been shortened.

Besides showing the immense importance to the country of an efficient veterinary service, such as we now have, this book traces the formation of the present service " piece by piece, in the face of opposition."

Although the book only now appears in book form, the fact that it was published as a supplement to the Veterinary Record in 1912-14 no doubt enabled the War Office to profit by its valuable lessons, and to avoid a repetition during the present war of the scandalous wastage of horse life and public money which was so shameful a feature of the war in South Africa.

It is obvious that this is a work which future historians must take into account, and, as regards its technical importance, the late Field-Marshal Sir Evelyn Wood V.C., who writes the Foreword, says :

" It would be difficult to exaggerate the importance of the study of the book by all army officers, and especially by those of the mounted branches and staff officers, at the present day and in the future."

ANNUAL REPORT OF THE PUNJAB VETERINARY COLLEGE, CIVIL VETERINARY DEPT., PUNJAB, AND THE GOVERNMENT CATTLE FARM, HISSAR, FOR THE YEAR 1918-1919. Printed by Superintendent Government Printing, Lahore. Price 10d.; obtainable from Constable & Co., 10, Orange Street, London, W.C., or T. Fisher Unwin, 1, Adelphi Terrace, London, W.C., etc.

COLONEL H. T. Pease, C.I.E., acted as Principal of the College during the year, and Colonel J. Farmer, C.I.E., as Chief Superintendent of the Civil Veterinary Department. There was a good entry of students for both the three and four years' courses, but owing to the war and the absence of the Post-Graduate professor on military duty, the Post-Graduate course was abandoned. Mr. W. Taylor occupied the chair of Pathology and Parasitology, and Mr. E. Burke, I.S.O., was Professor of Surgery; the other posts were held by native teachers. Fifty-seven men qualified during the year, and 17 men of the four years' course passed into the Army; 39 students passed their first examination and 34 their second. Owing to a severe epidemic of influenza the College had to discontinue work, and the lack of oil for lighting purposes and the rebellion in Lahore all contributed to upset the study at the establishment and render the pass list worse than in the previous year. The Farriery course failed owing to illness of the Head Farrier and his deputy, and no suitable man being obtainable for the post, the forge had to be closed to the public. The horse practice was about normal, the cattle practice declined somewhat, and in the small animals' hospital, 400 indoor

and 286 outdoor patients were treated. Fifty-seven dogs were inoculated against rabies, and the results proved very successful.

As usual, the demand for veterinary graduates increases, and the supply is totally inadequate. Another Vernacular College is badly wanted, as is also proper hostel accommodation for college students. In the Civil Veterinary Department there were seven chief members of staff. The Superintendents travelled the district widely in connection with horse and cattle breeding, the investigation of contagious diseases, and the inspection of veterinary hospitals. Influenza interfered with the work of the hospitals, and the work done there shows a decline from the previous year; 16,728 animals were castrated. The stud bulls and the stallions have increased in number. The Government Cattle Farm at Hissar did very satisfactory work.

G. M.

THE REVIEW OF APPLIED ENTOMOLOGY, October and November, 1919.—Series B: Medical and Veterinary. Issued by the Imperial Bureau of Entomology, 88, Queen's Gate, S.W.7., and sold by the same. Price 6d. net.

These little magazines are exceedingly useful for anyone who wants to keep abreast of the times on this subject in all parts of the world. All the insects and mites are studied in the various stages of their activity, and work and investigations in connection with them in countries so far apart as Albania and Dahomey and Italy and Japan are discussed and described.

The Review shows what powerful factors in the transmission of disease insects are, and it also shows how important scientists consider a study of their life and ways are in any effective control and eradication of disease.

We can thoroughly recommend the publication, as both interesting and instructive reading matter.

G. M.

NOTICES.

All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C.2. Telephone: Gerrard 4646. Telegrams: "Baillière-Rand, London."

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PROFESSOR J. SHARE JONES, D.V.Sc., M.Sc., F.R.C.V.S.,
Director of Veterinary Education in the University of Liverpool.

THE VETERINARY JOURNAL

Editor :

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HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING.

OFFICIERE DU MERITE AGRICOLE (FRANCE).

CAVALIERE DEL S S MAURIZIO E LAURO (ITALY).

HONORARY MEMBER OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION.
AND FORMERLY PROFESSOR IN THE ROYAL VETERINARY COLLEGE, LONDON.

Sub-Editor :

GLADSTONE MAYALL, M.R.C.V.S.

MARCH, 1920.

THE VETERINARY SURGEONS' ACT AMENDMENT BILL.

ALTHOUGH the Veterinary Surgeons' Act Amendment Bill has, thanks to the safe piloting of that distinguished surgeon, Sir Watson Cheyne, M.P., F.R.C.S., passed its second reading, and has now been referred to a Standing Committee, it is absolutely necessary that the members of the profession relax no efforts in obtaining the support of as many Members of Parliament as possible ; and in putting the details before them, it will be well to emphasise the fact that we are not in any way trying to obtain anything which will stop the castrator from earning his living as he does now, nor are we interfering with anything at present in existence.

The sole and whole aim of this present Amendment Bill is to enable the Council of the Royal College of Veterinary Surgeons to tax the members of the profession the small sum of £1 rs. a year with the object of obtaining a legitimate amount of finances in order to enable the College to render to its members the proper amount of protection which is their legal right.

There has been, and is, great opposition to the Bill from certain sources, and several misleading statements have been made with a view to blocking it—such, for example, as that a large number of “deserving and industrious men,” who at present earn a living by castrating, will be deprived of a means of livelihood ; and also that the object of the Bill is to eliminate unqualified practice.

The Bill does nothing of the sort. That a man must not, unless duly qualified, describe himself as a “Veterinary Surgeon” is already the law of the land, and no attempt is being made to extend or alter that ; and the bye-law which affects the unqualified assistant is not even alluded to in the amendment to the Bill. It is a bye-law which was passed some years since, and would have been enforced a long time ago but for the war. There is nothing more to explain—we are asking for nothing unreasonable, and if we have agreed to tax ourselves the matter is our own affair. The opposition is difficult to understand, and can only be explained by the very fact that those who have framed it have very evidently “got the wind up.”

However, opposition must be met by counter-opposition, and the only sure way for the profession to carry its point is for us one and all to write to or interview as many Members of Parliament as possible, as the matter will come before them for final decision, and they will be the deciding factors.

In short, we must impress upon those who have the power to help us that the objects of the Veterinary Surgeons Act (1881) Amendment Bill are :—

- (1) To provide funds for the R.C.V.S. Each practising member to pay £1 is. annually.
- (2) To give status to the practitioners registered under 1881 Act and bring them under jurisdiction of College.
- (3) To provide that Companies shall not infringe Act of 1881.

Opponents claim registration of unqualified persons on the following allegations :—

- (1) That the College seeks powers to eliminate unregistered practice.
- (2) That stockowners will be prevented from employing unregistered persons to perform operations of any kind on their animals.
- (3) That there is a dearth of qualified Veterinary Surgeons.

The first two allegations are proved to be without foundation, as is shown by the following opinion of the late Lord Advocate for Scotland :—" There is no provision either in the Act of 1881 or in the Bill striking at merely acting as a Veterinary Surgeon or at employing any person so to act whether qualified or not."

The third allegation is only true to the extent that the war reduced the number of students in Colleges, and that a number of members lost their lives on active service. Proper measures already taken to remedy this shortage are :—

(A) By College in granting exemptions from Prelim. to suitable ex-service candidates.

(B) By Ministry of Labour in awarding Maintenance and Training Grants to over 300 candidates to enable them to qualify.

There are, therefore, no grounds for the objections of our opponents. Unqualified persons are not touched in any way more than they were before.

The Bill is promoted solely in the interests of veterinary education, and contains nothing opposed to public interests.

PROFESSOR J. SHARE JONES, D.V.Sc., M.Sc., F.R.C.V.S.

It is a sign of the times that a British University has at last recognised in a tangible manner the value to be gained by the permanent attachment of a Veterinary Chair to the Teaching Faculty, and the University of Liverpool is to be congratulated upon having taken the lead. The Professorship of Veterinary Anatomy, which has been offered to and accepted by Dr. J. Share Jones, carries with it a seat on the University Senate, and Veterinary Anatomy thus receives a degree of recognition which has not yet been extended to any other branch of veterinary study. The occupier of this honour can settle down to study and teach with the full knowledge that until he has attained the age limit he is not likely to be dismissed and have to commence life again in a new sphere. It is a pioneer position, marking another distinct advance in the scientific progress of the profession, and Dr. Share Jones is to be congratulated on having thus had the years of work he has put in as lecturer on this subject so worthily recognised. His enthusiasm as a teacher, an author, and a worker on the Council for the welfare of the profession are too obvious and too well known to need comment, and as Director of the

Board of Veterinary Studies he has for some years had a large share in the progress which the Veterinary Faculty has made as a part of the University of Liverpool. This University was the first to encourage the mixing together of Medical and Veterinary in the same classes for such subjects as Chemistry, Botany, Biology, and Physiology during the first two years of scientific study, and the social side of the University life is equally open to the Veterinary students as to the students of each of the other Faculties.

Original Communications.

SOME OBSERVATIONS ON CANKER OF THE EAR IN RABBITS.

By C. J. DAVIES.

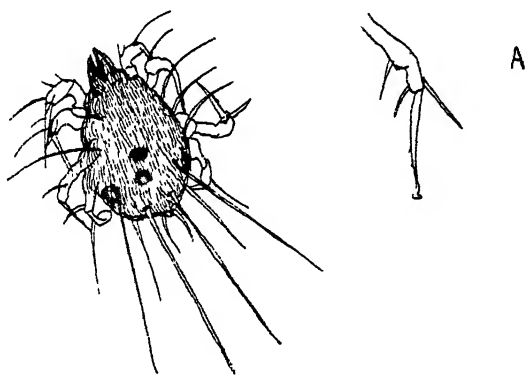
IN Neumann's "Parasites" (2nd Edn.), the rabbit's ear is said to be subject to the attacks of what are believed to be the same *Psoroptes* as cause a form of mange in the horse, and parasites from the latter are illustrated in the section dealing with *Psoroptic Otacariasis* of the Rabbit.

That the rabbit usually suffers far more from ear parasites than is commonly supposed, everyone who makes a study of the subject will soon find out. The French statement that canker of the ear was found in 25% of individuals examined was certainly not an over-estimation. Indeed, it is the exception in the present writer's experience to receive rabbits in summer time from other breeders which do not show signs of the trouble, if it is carefully searched for, although in the majority of cases the animals are quite well and healthy and do not appear to suffer any marked inconvenience from their uninvited guests. At the same time this is not always the case, and whereas a rabbit may have an ear half filled with débris and seem not much the worse, in other cases inspection may reveal no obvious disorganisation of the ear at all, yet the rabbit carries its head on one side, goes thin and becomes very ill and does not recover until its ears are treated for canker.

With the idea of completely freeing all our rabbits from canker, and acting on the assumption (advanced by veterinary experts) that canker is mainly, if not invariably, transmitted from rabbit to rabbit by more or less direct contact, a systematic dressing, at first daily, then every third day, and finally at longer intervals, was carried out throughout a small rabbitry for a year. Andre's liniment was used, applied with a camel's hair brush.

A beginning was made by systematically dressing the ears of each doe and her litter from the time the young were about a month old. Such young as were reared for stock were dressed at intervals throughout their life until they too bred and became the mothers of families. Hutches, nest boxes, etc., were thoroughly creosoted during the summer as opportunity occurred. At the end of a year the position was arrived at of possessing one old stud buck which had shown signs of slight canker and had had his ears dressed regularly and then at intervals; and several young bucks and does which had been dressed systematically almost from birth. All the rabbits then occupied hutches which had either been creosoted or distempered inside. Yet at the end of the year some of the rabbits were found upon examination to have a touch of canker in a few weeks after the regular dressing was stopped; and the progeny of these rabbits were likewise affected.

At intervals during the year, *débris* from the rabbit's ears was microscopically examined and slides made showing eggs, larval forms,



Parasite from Rabbit's ear (magnified 43 diameters). A. Leg (third from the head) further enlarged.

and a third stage (generally considered, I believe, to be the adult stage, of a parasite. But no parasites corresponding exactly to Neumann's *Psoroptes* were found. On the other hand, in every bad case of canker which has come under the writer's observation during the last fifteen years, in a rather bad case sent by a breeder last year, and recently in the ears of the old stud buck which was supposed to have had his "touch" of canker "cured" some months previously, parasites were found which were identified in Neumann (p. 104) as *Tyroglyphus longior*. The same creature has also been hatched in great numbers in the summer without artificial heat in *débris* taken from a rabbit's ear and left for some days sealed down on a microscopic slide.

Were it not that so great an authority as Neumann has pronounced the rabbit's trouble to be due to *Psoroptes cuniculi*, I should hardly have hesitated, as a result of my own experiences, to attribute the complaint to *Tyroglyphus*, and I should go further and say that all the evidence obtainable points to the view that adult rabbits and young ones in the nest are perpetually becoming reinfected with this parasite from the hay which is given them to eat and make their nests.

As rabbits seem to thrive in a most exceptional and remarkable manner when their ears are kept clear of parasites, it would be of interest to know if any suggestions can be offered as to a less laborious means of keeping down this trouble than dressing perpetually in the manner already described.

A STONE IN THE CÆCUM OF A DOG.

By FREDERICK HOBDAV, F.R.C.V.S.

(*London.*)

THE patient, a fox terrier, 12 years old, was admitted to hospital January 20th, suffering from general malaise and occasional sickness, of the reason for which the owner could give no definite history. The general dulness and depression had been observed for three or four days and the dog was very weak.

On the 22nd laparotomy was decided upon, as by abdominal palpation a number of stones could be felt and heard grating one against another.

Under chloroform the abdomen was opened and the large intestine exposed. In this could be felt four hard bodies, and another, triangular in shape and with sharp edges, was lodged in the cæcum.

By digital manipulation each was passed backwards towards the rectum, where an assistant manipulated a long pair of forceps, through the blades of which they were secured and withdrawn. Upon being washed and examined, they proved to be flint stones, averaging in size from a filbert to a large walnut, such as are used for making pathways in gardens. In fact, their source of origin was traced subsequently to a trip in Kensington Gardens, when the little boy of the owner and his tutor had thrown the stones for the dog to fetch and carry. Unfortunately gangrene of the bowel wall had already set in and the patient died on the 23rd. I have frequently had patients brought to hospital with stones in the small intestine and colon, but it is not common to find one lodged in the cæcum; and in this instance the orifice was so inflamed that it could not possibly have returned without assistance.

CALCULUS OF THE BLADDER AND SUPRA-PUBIC CYSTOTOMY IN A BITCH.

By FREDERICK HOBDAV, F.R.C.V.S., AND HAROLD STANTON,
M.R.C.V.S..

(London.)

THE patient, a small Pekingese bitch, seven-and-a-half years old, and between 8 and 9 pounds in weight, had enjoyed excellent health until six months ago, when she shewed a little irritation during urination and a certain amount of incontinence; becoming, as the owner described it, "dirty in the house."



Skiagraph of Pekingese Bitch with Calculus in the Bladder.

She was first brought to us early in August, 1919, and upon examination we diagnosed pregnancy, but as the owner stated that this was quite impossible, she was not kept in hospital, but returned home with a supply of sedative medicine for the bladder irritation. However, at the end of August, she returned to hospital and was delivered of a puppy. Recovery from this was uneventful, but the bladder trouble increased; and, after a skiagraph had been taken, an operation was decided upon.

The calculus was removed by the supra-pubic operation and the little bitch was sent home next day, a special canine nurse being engaged to look after her. Convalescence, with the exception of a buried suture trouble, was quite uninterrupted, and she has made an excellent recovery.

ANÆSTHESIA IN BOVINES.

By ALFRED J. MILLIGAN, M.R.C.V.S.

*(Annan).**Position of the Patient* during the administration of chloroform.

WITH a cow that has horns I now cast without hobbles, as the horn is apt to be broken during the fall. I put a rope round the horns, a half-hitch round the body behind the elbow and another round the body in front of the mammary gland. I then give a steady pull on the rope and the animal is down. I then get a number of bundles of straw—these, of course, are previously prepared—and pack them from behind the withers and along the neck to the head. It is not necessary to put her on her sternum, but in a position midway between lying flat and a natural one. The reason for this is to prevent her from swelling as the gases in rumen always accumulate when a cow lies for a considerable time or even for a short time. The head is allowed to rest on the bundles of straw, the normal angle being maintained as far as possible. I do not fill the bags tightly with straw as the lower horn is apt to penetrate them. The attendant administering the chloroform goes on his knees and holds the upper horn.

Methods of Administration.

My first method was to pour the chloroform on to a piece of flannel or lint stretched across a metal mask of the human pattern. This was held over the upper nostril with one hand and the under nostril closed as desired with the other hand, so that the vapour was inhaled with one nostril only. This was a costly and tedious process as it always took, even under the most favourable circumstances, 20 to 25 minutes to put a cow completely under anæsthesia, and the quantity of chloroform used was from 4 to 6 ozs. If the animal had to be kept under for a considerable time there was not much left out of a 2-lb. bottle. It was a safe method for the cow, but a sickening job for the man at the head.

For some years I have used a "Hobday" mask. It is applied to the cow the same as it is applied to the horse; only I do not interfere with the tongue, nor do I bundle a rug round the mask. The attendant steadies the head by the upper horn.

After the initial struggling a cloth may be laid over the mask if the animal is in the open. 1½ oz. of chloroform sprinkled on cotton wool and placed in a "Hobday" mask is usually sufficient to anæsthetise a cow in 10 to 12 minutes; by applying 2 drachm doses occasionally the animal can be kept under as long as is necessary.

In a case of difficult parturition, which I anticipate will last a considerable time, I administer 1 oz. of chloral hydrate previous to applying the mask with the chloroform. The chloral I dissolve in 2 oz. of warm water and mix with 10 to 12 ounces of milk to make a drench.

My reason for giving chloral is that the mask can be removed after 2 ounces of chloroform have evaporated and the chloral is sufficient to keep the animal quiet enough for all purposes for a long time. The advantages of the "Hobday" inhaler over the old method are :—

1. Easy administration.
2. A small quantity of chloroform can be used.
3. Thus the animal is quickly anæsthetised and much time is saved.

Up to the present I have had two casualties in cattle when operating under chloroform, but in each the cause of death was accounted for upon *post mortem* and could scarcely be attributable to the use of the anæsthetic.

CASE 1.—A steer upon which I was operating on for pelvic hernia. It died when I was putting in the last stitch.

This animal had been ill for days and had received several doses of purgative from the owner. It was in an advanced stage of peritonitis and the amount of chloroform administered was only 2 ounces.

CASE 2.—An aged shorthorn cow, in fat condition, with an everted uterus.

As I got this animal early and the uterus had been supported in a clean sheet, I attempted to return it without chloroform. After much straining I had it almost in three or four times, but each time it was put out again. I then decided to use chloroform and applied a mask and $1\frac{1}{2}$ oz. of chloroform. In about $1\frac{1}{2}$ minutes the animal was dead. My only regret in this case was that I did not chloroform to begin with, as the patient had become very much exhausted.

FRACTURED RIBS AS THE RESULT OF MUSCULAR ACTION.

By CAPTAIN E. H. WYLEY, R.A.V.C.

THE subject of this article was one of a pair of l.d. horses attached to a waggon loaded with manure. As the waggon was descending a rather steep and somewhat long hill, the brake failed to act, resulting in accelerated speed of the vehicle. This caused the animals to break into a trot, which soon became a gallop. The hill terminates in a busy thoroughfare, and in this street, on the footpath, exactly opposite the

hill, stood a round red letter-box, into which the waggon dashed, the point of the pole striking the pillar box right in the centre and knocking it over. Both horses fell ; one on either side of the letter-box. The left or near horse got up almost immediately, the other made no attempt to rise and died in about five minutes. I was sent for and on arrival found the animal lying on his right (off) side, dead.

A casual examination pointed to internal hæmorrhage. The other horse had escaped with nothing more serious than a few abrasions on the inside of his left thigh. The carcase was taken to hospital, where a thorough external examination revealed nothing in the form of wounds or marks to show that the animal had met with an accident. Removal of the abdominal viscera afforded very little evidence as to the cause of death. On excision of the diaphragm it was noticed that the thoracic cavity was filled with blood. The heart and lungs were carefully removed, but nothing definite was found to account for the presence of such a large quantity of blood. The chest cavity was thoroughly washed out and then I noticed a patch of discolouration of the pleura at the antero-lateral extremity of the thorax. On manipulation over this area I was able to pass my hand through a jagged opening in the thoracic wall ; the right (off) fore limb was then partially detached from the trunk, and this revealed a complete fracture of the 1st, 2nd and 3rd ribs, together with extensive injuries to the vessels in the immediate neighbourhood.

REMARKS ON CHLOROFORMING STANDING AND SECURING FOR CASTRATION.

By W. ASCOTT, M.R.C.V.S.

Bideford.

I quite agree with those who advise caution if chloroform is administered standing, whether in a loose box or in the open ; for if one waits until the patient falls or lies down, it is asking for trouble. I forget when the method was first written about, but it was many years ago. The plan then recommended was to have two long ropes attached to the halter, with one or two men to each on either side at right angles to the patient, in order to control the movements during the period of excitement. I tried this plan at first, but soon modified it, as I found it much simpler and safer not to wait until the chloroform was well under weigh, and as I have used this modification in some hundreds of cases without a single mishap, it may not be considered out of place if I explain the method. It will be easier, perhaps, to explain if I describe, say, an ordinary preparation for castrating

a colt, no matter whether he has been haltered before or not. After haltering in the usual way with a long rope attached to the halter, I get an inhaler of Nelder's pattern, one with the cap hanging loose. When all is ready, one and a half to two ounces of chloroform (according to age and size) is put on the pad, the cap buckled on, and the colt is run out at once as quickly as possible to the field where the operation is to be carried out—usually, say, from fifty to a hundred yards. By the time he gets there he is invariably dazed, and you can at once walk right up to him and commence putting your ropes on, and by the time you have him down and tied up he will be sufficiently under to commence the operation. Everyone has their favourite method of roping, and I have mine. I don't think it has any particular advantage over the customary neck rope and side lines (except one which I will mention later) if you are not giving chloroform standing, but if you are, I think it has, so I will describe it also, although no doubt it is familiar to many of your readers. I use a single stout rope, $8\frac{1}{2}$ yards long, with an eye in one end. Making a noose, I get it on the near fore pastern, carrying the free end round the near hind, and give it a twist. Then across to assistants on the offside, who throw by pulling on the two legs at right angles to the colt (just as many throw calves); at the same time I seize the tail and materially help in tipping him over. By this time the struggles are usually feeble and aimless, and there is no difficulty in passing the end of the rope under the neck, see-sawing it to behind the withers—then catch up the off-hind foot with it, and pull it down to the shoulder. This makes a perfect back rope. Now take two more turns round the pastern, then back around the gastronomic tendons and forward round the front rope; repeat and fasten. This bends the hind leg and pulls it up out of the way for operating. The off-fore can either be left loose or, if the men at the head are nervous, tied with a separate short rope by bending the leg on itself. It must not be fastened to the other rope; leave it free, whether doubled up or not. I learnt this method some thirty-six years ago from the late Mr. R. G. Verney, of Stratford-on-Avon, who averred that he and his father before him had thrown many hundreds (if not thousands) of colts in this manner and never had a broken leg or back. His theory was that by tying in a "three-cornered way and leaving one leg free, the colt couldn't get an even strain on his back, and the rope as placed on the off-hind acted as a thigh hitch. Whether there is anything in it, or whether it is purely a matter of luck, I am not prepared to say, but as I have also been fortunate with it, I naturally think it a good method.

GENERAL ANÆSTHESIA IN BOVINES.

By ARCHIBALD EDGAR, M.R.C.V.S.,
(*Withhorn.*)

Now that the subject of general anæsthesia is the topic of conversation wherever members of our profession meet, a short article on the application of anæsthetics to bovines may prove interesting to the older members of the profession and instructive to beginners.

The question is often asked—Are bovines suitable subjects for the administration of chloroform? So far as my experience goes, they are, and I would add “very suitable subjects”; in fact, I know no animal that will go under the influence of chloroform quieter and with less excitement than a dairy cow. The reason that I have formed that opinion may be caused by my experience being chiefly confined to parturition and eversion cases, where the animal is naturally inclined to keep the recumbent position. If they are anæsthetised in the standing position, when once they go off their feet they don’t as a rule struggle and try to get up, as a horse is inclined to do, and if done lying down they very rarely attempt to get up.

The chloroform is administered in much the same way as to the horse, with the exception that in the horse the muzzle is applied over the upper jaw only, and in the cow both jaws are included in the muzzle. The dose and general effect is much the same in both subjects; the cow will not jump to her feet after the operation as quickly as a horse, unless forced to do so. It is not necessary to secure a cow’s legs.

There is one difference in operating on the horse and cow under chloroform, and it is an important one to the beginner. A horse will lie flat on his side for hours without any harm, but a cow (particularly if on a full stomach) will not lie long before she becomes tympanitic, and if she is not raised on to her sternum she may suffocate.

In order that the procedure may be better understood by beginners, I will describe my last three chloroform cases. Strange to say, two of my recent cases were torsion of the uterus. It is rather unusual to have two cases of torsion in a fortnight.

The first case was an Ayrshire cow, bought at a market on Monday, February 2nd, and brought home by rail on Tuesday. On arrival home, the owner noticed her straining as if for calving, but as no water appeared, and the symptoms were not urgent, this was allowed to continue until Friday, February 6th, when she went off her food and I was called in. On examination, I found a torsion. Had the cow removed for byre into a nice roomy loose box, well bedded with straw. The dairyman was my only help, to begin with.

A rope was fastened to her horns and the muzzle applied with about 2 oz. chloroform. In two or three minutes she commenced

to sway, but did not go down until I put an ounce more chloroform on to the cloth. This soon had the desired effect. A good pull at the tail and she went down and never gave a struggle ; one turn over the body and the torsion was reduced. The os was not sufficiently dilated to proceed with taking the calf away, so the muzzle was removed and the animal packed on her sternum. Instructions were given that if the cow did not calve in 12 hours, to let me know. She did not calve in the time. On my second visit, one foot and head were through the os and as the other foot was easily brought into position, the cow was not chloroformed again.

The second case was on July 25th, also a torsion. The animal had never been off the farm. In this case the cow was lying down, so I loosed the neck chain, fixed a rope round the horns and applied the chloroform in the usual manner. The cow never attempted to get up, but showed a little more excitement than usual by tossing her head and pressing the muzzle against the wall, breathing heavily ; wild appearance, much resembling a cow going into a fit. This stage passed very quickly, and when under she was pulled on to the walk of the byre. She had to be turned two full turns before the torsion was reduced, but calved a living calf quite easily, although it came hind legs first.

The third case was one of difficult parturition—July 28th.

This cow was also in the recumbent position, and was treated the same as Case 2, but she rose to her feet after the chloroform was applied, and had to be pulled down by the tail. She never gave a struggle and showed no excitement. She was under the influence of the drug for an hour. By the time I had washed up she was sitting on her sternum as if nothing had happened.

These cases are very typical of the way bovines act under chloroform and the beginner need not have any fear of trying it. He may meet an excitable case at times, but if he lets the excitement be on the cow's part only, keeps cool himself, and keeps on applying the drug, the animal is bound to go under.

Poultry also take chloroform very well. I have only tried it in three cases. A very small dose put them over, and they seemed none the worse afterwards.

VETERINARY PRACTICE IN IRELAND.

By MAJOR D. M. STORRAR, F.R.C.V.S., T.D.,
(*Crumlin, Mon.*)

THE situation in Ireland at present and the dastardly attack made upon a member of our profession reminds me of an incident that occurred to me when practising in Ireland during a rather disquieting time, viz., from 1879 to 1889, happily without any bad result. The

Land Leaguers were the troublesome "bhoys" in those days and their sport was shooting landlords and other agents, or anyone who did not agree with them regarding the possession of land.

One got quite accustomed to hearing of landlords and other agents being fired at, so much so that when a shot was heard the general expression was : " Hello ! another landlord gone." At that time one knew what the " disturbers " wanted and they have got nearly all they were agitating for, but I doubt if the Sinn Feiners of the present day know what they want. If the " ould " country was left alone by the agitator, it would be the best and cheapest country in the world to live in ; the people are the most hospitable ; all sportsmen (every man, woman and child) and lovers of animals ; and the veterinary profession holds a better social position in Ireland than in any other place I know. But I am nearly forgetting the incident. I was sent for by a Resident Magistrate to see a horse at his place, some twenty miles from my home. I travelled by rail to C—— Station, where I was met by the R. M.'s wife, with wagonette and pair of horses. The coachman wore a belt, with a brace of revolvers stuck in it, round his waist, the lady also had a belt with a revolver. A car with two police took the lead and another car with two more police followed after us to the R. M.'s house, about two miles from the railway station. On driving down the avenue I noticed some dummies, like " Aunt Sallies," at intervals on the lawn, and upon enquiring what they were I was told that the R. M., who never travelled without a Winchester rifle, practised firing at them as he drove to and from his house. After seeing my case and finding I had several hours to wait before I could return (as trains were few and far between in those days), I was entertained by the R. M., who explained to me the efforts he was making in his district to try and quieten it, and also teach the tenants who were anxious to live in peace how to defend themselves from the attacks by " moonlighters," etc.. I saw several engaged in revolver practice, making a very poor attempt at hitting the gable end of a house. I was asked by the R. M. to dine with him, and on entering the dining room my attention was drawn to a thick mahogany table that was turned on its side and placed against the French window ; this was to prevent anyone firing at us from the shrubbery outside during dinner, and as the table was pretty thick I did not feel so nervous that I couldn't eat my dinner. During dinner the butler came in with a box that had just arrived. This turned out to be a fresh supply of revolvers from Dublin Castle ; and here I would remark that the R. M. was what was called a " marked man," and had been warned by the Castle to take every care of himself ; hence the precautions. After dinner (it was then getting nearly 10 p.m.) the R. M. remarked that he

hoped I would not mind walking to the station as he never, unless absolutely obliged, sent any of his conveyances out after dark. As the station was a good two miles off and the road lay through a very dark, thick wood, I did not relish the idea very much, but said I didn't mind, and to my great relief he said, "Of course, I shall send an escort with you." The escort consisted of a policeman and a soldier, each carrying a Winchester rifle, a bull dog, and a retriever, both of which seemed rather uneasy as we tramped along. However, nothing happened and I made up my mind that the next time I had to visit my case I would go at a time to enable me to return in daylight.

PHANTOM PREGNANCY IN THE BITCH.

By HENRY B. EVE, M.R.C.V.S.,
(Folkestone).

Subject.—A pedigree white bull terrier bitch, aged 12 years, suffering from obesity, habitual constipation, anæmia, and fainting attacks occasionally. The owner thought she was in whelp, but not mated this time unless unknown to him accidentally. However, had been on a false heat.

History.—As he described. The bitch I had attended before for dystopia and constipation. She had been delivered of pups, which at times were born alive, at others dead. Owner thought that she had perhaps dead pups inside her.

Symptoms.—The bitch appeared dull, languid, listless, disinclined to move, very swollen in abdominal region, which was enlarged; pendulous, constipated, big and hard in the right flank, suggesting fœcal impaction, and behaved in every respect as if going to have a large litter. There was an accumulation of milk in the mammary glands, and a brownish discharge issuing from "vagina." The bitch sat on her haunches, with elbows turned outwards, which relieved the breathing temporarily. During the act of locomotion, when made to do so, she showed general debility and parælegia, staggered like "vertigo," and urination was suspended. Pulse was weak, irregular and intermittent, temp. sub-normal. Respiration accelerated during movement, shallow otherwise. Dulness was manifested on percussion and fluctuation was especially noticeable on "percussion" of the abdomen, which act caused evidently great distress in breathing, bordering on collapse. There was no œdema of the limbs noticeable. Auscultation revealed "heart disease," which I diagnosed as "mitral disease," complicated by liver trouble (chronic).

Diagnosis.—Heart disease complicated by chronic liver trouble and ascites.

Prognosis.—Unfavourable; advised destruction, but the owner wished for treatment, the dog being a great pet.

Treatment.—Gave medicinal paraffin internally, and gastro-intestinal lavage and glycerine suppositories to overcome the constipation. Hyp. inj. of camphor oil sterilised (P. D. & Co.) to act as heart stimulant, which acted well for a time and seemed to give relief. Then resorted to (Nitro-glycerine Co.) (P. D. & Co.) nitroglycerin, Tinct. strophanthus, digitalis, belladonna tablets given with brandy and water. The bitch improved for a time and walked about, urinated voluntarily (previously catheterised) and milk disappeared. Then I tried (P. D. & Co.) apocynum ext., which I've found excellent for dropsy, and acted well for a time. However, owner decided to destroy owing to leaving the district, and not wishing for quarantine regulations, I destroyed her with chloroform and asked for p.m., at which he was present.

Diet.—Brand's Essence, nutrient suppositories.

P.M. Lesions.—Revealed valvular disease of both sides of the heart, accompanied by fibrous thickenings, fatty degeneration of the liver, which was enlarged, complicated with "cavernous angiomas." The spleen showed "Hæmorrhagic lymphadænomas" and lungs with "anthracosis." Ascites also present but no acute or chronic peritonitis. The latter I suspected. I sent the viscera to Prof. G. H. Wooldridge, F.R.C.V.S., who kindly examined them and confirmed the lesions present, which were interesting.

Remarks.—The bitch was thought to be at the change of life period by owner, which was quite likely, seeing the age of animal. The liver and heart lesions no doubt accounted for the "ascites" and spleen for the general debility. The former for the paraplegia and fainting attacks.

General Articles.

THE POISONING OF HORSES BY THE COMMON BRACKEN.*

(*PTERIS AQUILINA* L.)

By SEYMOUR HADWEN D. V.sc (Pathologist) AND E. A. BRUCE, V.S.,
Assistant.

Veterinary Research Laboratory, Agassiz, B.C.

A disease known locally as Staggers has been prevalent on the Pacific slope for many years. It is characterised by uncertain gait, loss of equilibrium, general unthriftiness and unimpaired appetite. The greatest number of cases occur during the winter months, the disease being most common when the weather is severe and protracted. Treatment if instituted early is usually successful, but neglected animals generally die.

*The Department of Agriculture, Canada (Animals Board).

On all the farms where cases occurred, bracken (*Pteris aquilina* L.) was found in the hay. While it was thought that bracken might be the cause of the trouble, very little literature could be found on the subject. Various authorities have mentioned that the plant was suspected of being poisonous, but do not support their statement by any experimental evidence. The best description of bracken poisoning is given by Lander, in his book on toxicology, *i.e.*, "The poisoning of horses after prolonged feeding on bracken along with other forage is mentioned by the German authorities." Poisoning is thought to be due to the effects of an acid (pteritannic acid) similar to, and possibly identical with, filicic acid of male-fern. Bracken poisoning of the horse does not appear to have been reported in Great Britain, but quite recently we were advised by a returned army veterinarian (L. D. Swenerton) that he had seen some cases in the South of England that had been fed on ferny hay from Northumberland. At the time, however, he did not connect the bracken with the trouble, as at that time he had not seen our preliminary communication. In 1909-10 the British Board of Agriculture investigated a somewhat obscure disorder that occurred in cattle in the early autumn (August-November) after eating bracken. This investigation was confined to cattle and the results obtained show no similarity to the disease with which we are dealing; this may be due to the fact that green bracken was used; their findings, however, were inconclusive. We have never seen cattle or horses eat green bracken unless starved to it.

We have evidence that the disease occurs in Washington and Oregon as well as in British Columbia, and in view of the fact that *Pteris aquilina* has a very wide distribution it seems probable that the fern causes trouble elsewhere. During the hard winter of 1915-1916 the mortality amongst horses in the Fraser Valley and on Vancouver Island was very heavy. As an extreme instance we cite the following:—In the little village of St. Elmo, B.C., out of twenty-four horses owned by eleven farmers, sixteen died of bracken poisoning, four recovered, and the balance (four) did not take the disease. To determine definitely whether bracken was the cause of the disease known locally as Staggers or not, it was decided to conduct some experiments. Permission was obtained from the Veterinary Director General to buy the necessary animals and incriminated feed. As the disease has only been reported when horses have been confined, it was decided to simulate, in so far as possible, the conditions under which animals became affected. It was commonly believed by the majority of people that cold weather was partly responsible for the disorder, but the only bearing such has on the case is that during

cold weather the animals get little or no exercise and are not able to supplement their food by picking grass or other green food. The horses attacked are usually those that receive the minimum amount of care, but well cared for greedy horses may contract the disease through eating their bedding, which often consists of bracken that has been left in their mangers.

NOTES ON EXPERIMENT NO. I.

Two aged horses were procured and a supply of hay that carried 20 per cent. bracken.

One horse was fed the day after all fern had been picked out of it, the other animal received the same hay plus the fern. Average daily feed, control horse twenty-four pounds of clean hay; experimental horse seventeen pounds of hay and seven pounds of bracken.

No other food was given either animal.

Both horses were kept in box stalls and allowed no exercise.

April 1.—Feeding commenced.

„ 24.—Fern horse breathing hard; seems to drag his legs.

„ 29.—Fern horse shows slight signs of intoxication.

„ 30.—Fern horse shows undoubted signs of intoxication.

May 1.—Fern horse intoxicated, nearly fell when made to get over in his stall.

„ 2.—Fern horse much worse, was found down at 6.45 a.m., and could not be made to stand. Towards evening he showed a full soft pulse. Struggled now and then. Moved the legs continuously. Looked completely intoxicated. Pupils slightly dilated.

„ 3.—Fern horse, pulse sixty-four. Animal weak and had nervous spells. Trembling. Eats and drinks well. Distinctly intoxicated. Does not struggle. Fæces loose.

„ 4.—Fern horse much weaker; pulse eighty. Nervous spells more frequent. Animal so weak it can hardly get up on its sternum. At night was unable to raise its head off the ground, and though it could not masticate would grasp food between its teeth. Continually twitching. Blood taken coagulated in ten minutes; serum clear and yellow.

„ 5.—Fern horse very weak. Still having nervous spells. The head was drawn into the neck, the feet which were on the upper side would stand out stiff, the back would arch and all the muscles became tense. As soon as an attack was over the muscles relaxed

and the animal breathed heavily until restored. As the horse was battering himself about badly and was clearly dying, the carotid was severed and the animal bled to death.

Autopsy.

The stomach contained about two quarts of a sticky light olive green liquid, which proved to contain bile by Gmelin's test. There were some red spots at the junction of the cardiac mucous membrane. The small intestines contained some well-chewed food. All the other organs were normal except the kidneys, which appeared congested in the cortical portion. The brain also appeared congested. The blood clotted normally.

During the whole period of feeding temperatures were taken morning and evening; these proved to be normal.

The control horse that was fed on the hay out of which the fern had been picked, showed absolutely no ill effects.

NOTES ON EXPERIMENT NO. 2.

As in the preceding experiment two horses were procured (one having served as control in Experiment No. 1), and a quantity of hay that carried a high percentage of bracken.

One animal received the hay after the fern had been picked out of it, the other received the same hay plus the fern. Average daily feed: control horse twenty-four pounds of clean hay; experimental horse, thirteen pounds of hay and eleven pounds of fern.

Both horses were kept in adjacent box stalls and allowed no exercise.

June 1.—Feeding commenced.

„ 23.—Supply of fern ran out; had to resort to cutting and drying freshly cut bracken, which could not be properly cured owing to continued wet weather.

„ 24.—A small amount of hay was received that contained a little bracken. It was not until July 6th, however, that a sufficient supply of dried fern could be obtained; therefore from June 23rd until July 6th the material fed was a poorly cured sample.

„ 29.—Fern horse shows yellowish red conjunctivæ.

July 1.—A careless attendant was caught giving the fern horse green clover; this, coming on top of our difficulty in procuring properly dried bracken, did not look any too hopeful for our experiment.

„ 8.—Fern horse was noticed to be staggering badly. When the head was raised the animal was inclined to fall.

- July 9.—Fern horse worse. Pulse soft and weak, forty per minute. The urine was examined and found to contain no albumen nor sugar.
- „ 10.—Fern horse progressively weaker. Shows distinct signs of intoxication. The eye has an intoxicated look. When the animal is pushed it sways to and fro. Appetite unimpaired.
- „ 11.—Fern horse about the same. Pulse forty-two and weak. Intoxication marked.
- * „ 12.—Fern horse was found down in the morning, but was helped up. Pulse fifty-nine, weak and irregular. Respirations forty-seven per minute. Pupils slightly dilated. When head was raised a few inches the animal nearly fell.
- „ 13.—Fern horse pulse fifty-two, weak and irregular. Head carried low.
- „ 14.—Fern horse pulse same as yesterday. Pupils more dilated. Head carried very low.
- „ 15.—The fern horse went down between 7 and 8 a.m., and could not be made to stand. Animal has nervous spells, twitching of the muscles, more especially of the face. Animal getting badly bruised.
- „ 16.—Fern horse battered up badly. Pulse seventy-two and weak. Visible m.m.s yellowish red. Temperature 99.5. As the animal was moribund, the carotid was severed at 11.7 a.m. Blood taken at 11.9 a.m. had set by noon (when it was first noticed).—Autopsy.

General condition, emaciated. Lungs normal but for some emphysema of long standing. Trachea and bronchi congested. Heart normal. Kidneys, cortex congested. Bladder normal. Spleen normal but for some old adhesions. Liver contained a few chalky deposits (degenerated parasites), and was congested. The duodenum contained bile and thick frothy mucus. The large intestines were normal. The most noticeable changes were found in the stomach, brain and spinal cord. The brain and cord were greatly congested. The stomach contained about a gallon of gelatinous fluid which contained blood and mucin; no bile could be demonstrated. The whole surface was covered with a sticky mucus which held minute particles of bracken. The villous mucous membrane was greatly swollen and congested.

During the experiment temperatures were taken twice a day; no abnormal temperatures were recorded.

The control horse showed no ill-effects from eating the hay out of which the fern had been picked.

NOTES ON EXPERIMENT NO. 3.

The subject is this experiment was the horse that had served as control in the two previous experiments. The animal was confined as were the former subjects and was fed with ferny hay just as it was received. The hay was found to contain 29 per cent. bracken. The approximate daily feed was $20\frac{1}{4}$ pounds; of this bracken composed about $5\frac{3}{4}$ pounds.

October 27.—Feeding commenced.

November 25.—Up to this time the animal laid down at night.

„ 26.—Did not lie down during the night.

„ 27.—Did not lie down during the night.

„ 28.—Animal went down at 3.15 p.m., was helped to rise.
Temperature 99.8.

„ 29.—Animal down and cannot rise. Tetanic spasms, the head being drawn back. Pulse seventy-six, fairly strong. Temperature 97.4.

„ 30.—Animal much the same as yesterday. Temperature 100.3

December 1.—Animal not so violent as former subjects, otherwise much the same. Pulse eighty and weak. Temperatures 99.5 a.m., 100.9 p.m.

„ 2.—Animal found dead in the morning.

Autopsy.

Blood dark. Liver and kidneys engorged. Clots in heart. Lungs and spleen normal. Stomach contained dry ingesta and was distended with gas. At the cardiac end the mucous membrane was lined and crevassed; at the junction of the pyloric portion there was a deep erosion and under this was a gelatinous infiltration. The bottom of the crevasses was red, giving a raw-looking appearance. The duodenum was covered with a slimy thick mucus of a greenish yellow colour and had reddened areas. In the ilium the catarrhal exudate was of a greyish colour. The large intestines were more or less empty. The bladder was full of urine, faintly alkaline and containing albumin. The brain was congested and there were well marked hæmorrhagic areas under the pia-mater of the cord.

During the experiment temperatures were taken twice a day; no abnormal temperatures were recorded.

The hay fed to this animal was weighed carefully at each feeding; the total amount consumed was 670 pounds, of which about 29 per cent was bracken; the amount of fern fed was therefore 194.3 pounds.

NOTES ON EXPERIMENT NO. 4.

The subject in this experiment was a strong, healthy gelding. The amount of hay and bracken fed was as follows:—

From March 13 to April 2.

Fed 290.5 pounds of hay, and 93.5 pounds of fern; daily feed of fern equals 4.4 pounds.

From April 3rd to April 23rd.

Fed 406.4 pounds of hay and 51.6 pounds of fern; daily feed of fern equals 2.4 pounds.

From April 24th to May 23rd.

Fed 333 pounds of hay and 202 pounds of fern; daily feed of fern equals 6.9 pounds.

May 19.—Up to this date the animal appeared normal.

„ 20.—Conjunctivae yellowish red. Shows slight symptoms.

„ 21.—Abdominal breathing noticed. Pulse 24.

„ 22.—Staggering. Eyes have staring look. Conjunctivae yellowish red. Not feeding well.



FIG. 2.—Stomach of Case No. 2. (Note mottled appearance).

May 23.—Animal off feed and staggering badly. Temperature 99.4. Pulse 26.

„ 24.—Animal quite intoxicated. Pulse 32.

„ 25.—Staggering badly. Fell down but got up. Was turned out into yard. Temperature 99.4. Pulse 40.

„ 26.—Staggering badly. Animal killed.

Autopsy.

Carcase in fair condition. Icterus. Liver congested. Lungs emphysematous. All other organs normal with the following exceptions: Brain greatly congested, the convolutions being sharply defined

on section. Cord congested. Stomach, regurgitation of food, small amount of bile present, cardiac portion showed some old eroded patches, pyloric portion showed reddened areas with small hæmorrhages. Small intestines bile stained and empty except for a slimy yellowish green mucus, some of which was in clots. Bladder full of urine, no albumin or sugar present.

SUMMARY OF EXPERIMENTS.

The foregoing experiments indicate the cause of "staggers" in horses to be due to the ingestion of dried bracken over a certain period and under certain conditions. No toxic properties can be attributed to the hay, as an animal fed on hay out of which the fern had been picked remained absolutely normal. Of the four animals that developed the disease, one showed symptoms on the 24th day and was dying on the 35th day, when it was put out of its misery. The second horse did not show marked symptoms until the 38th day,

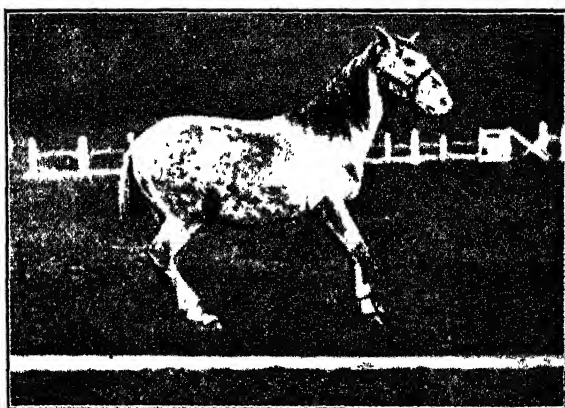


FIG. 1.—The typical staggering gait.

and was dying on the 46th day, when it was killed. The length of time it took the second horse to develop symptoms as compared with the first was no doubt due to the fact that for about twelve days properly dried bracken could not be procured, and also to the mistaken kindness of a careless attendant who was caught giving the animal green clover. The third horse, which had served as control in the two preceding experiments, was fed on hay exactly as received from a local source. The hay carried 29 per cent. bracken and caused the death of the animal in 36 days. The fourth experiment was somewhat different to the others; this animal was fed 4.4 pounds of fern per day for three weeks, and was then reduced to 2.4 pounds per day for a further three weeks with no apparent ill resulting. Upon increasing

the daily feed of fern to 6.9 pounds definite symptoms of the disease were noticed on the 29th day (after this increase) and the animal was killed on the 35th day.

Judging from the foregoing, it can be assumed that an addition to the daily diet of about six pounds of dried bracken will kill a horse in about one month.

PATHOLOGICAL FINDINGS.

The brain and cord showed marked congestion. No bacteria were found either in their substance or fluids.

The stomach is the organ chiefly attacked, as would be expected from the nature of the food, which is highly acid. The pyloric end shows the greatest change; fig. 2 illustrates the condition to a marked degree. The m.ms. have a mottled appearance, and bile stained, and in some places there are bleeding eroded areas.

SUMMARY.

In the March number of *The American Journal of Veterinary Medicine*, L. H. Pammel, of the Iowa State College, reviewed a preliminary communication made by us before the British Columbia Veterinary Association at Vancouver, B.C., on December 6th, 1916. In view of Dr. Pammel's well known association with poisonous plants, it may be of interest to quote his words, viz., "The bracken is an extremely common plant along the entire Pacific coast, especially in Oregon and Washington and from British Columbia to Alaska. The experiments seem to show that the bracken is poisonous. This fern, like many others related to it, has been regarded as poisonous. However, there are few definite facts on the nature of the poisoning. Many, if not all, of the ferns contain filicic acid and a fixed poisonous oil. In this case, as in others, we need some careful chemical investigations to prove the poisonous nature of the plant. We hope that this investigation will be forthcoming."

While up to the present we have not had any satisfactory analysis made, the physiological experiments cannot be gainsaid, and further, we draw attention to the fact that on all farms visited by us where the disease existed, bracken was present in the hay.

That the toxic principle is insoluble in water has been established, as in addition to the feeding experiments already mentioned a watery extract was prepared and administered to a horse, twice a day for some sixty-four days. This extract was concentrated down until one cubic centimetre was approximately equivalent to one gramme of the dried fern. The usual daily dose was two thousand cc., but one day as high as five thousand five hundred cc. was administered. In all the animal received the equivalent of about two hundred and ninety pounds of fern, during which time he was only fed clean hay and was

not allowed any exercise. No symptoms of bracken poisoning were noted, notwithstanding the fact that this animal had consumed, in the form of an extract, one hundred pounds more than the amount of dried fern necessary to kill experimental horse No. 3.

Emphysema of the lung has been noted, and congestion of the liver. The blood was normal no bacteria were found, and there was no variation in the percentages of the different leucocytes.

The disease as it occurs on the average farm in British Columbia is brought about in the following manner :—

Bracken (*Pteris aquilina* L.) is found in a large amount of the hay grown in the lower parts of the province, especially so on newly cleared or poorly worked farms, and it is on such farms that the disease is most common. During the severe weather the animals are confined for a long period, and none too liberal an allowance of hay given each animal, the result being that horses that otherwise would leave the bracken in their mangers are forced to eat it. (We have never seen an animal eat green bracken, and as a general rule horses do not eat dried bracken unless forced to, except greedy horses that eat their bedding, which often consists of fern rejected out of their hay.) The affected horses in nearly all cases received but little else than hay in the shape of food ; where animals were given plenty of hay and roots, with occasional feeds of bran and oats, no trouble of this nature occurred. In this connection it may be remarked that no cases were reported in the city stables. While it is evident that a small amount of bracken can be eaten with impunity, large amounts, coupled with unhygienic surroundings and lack of variety in diet, will bring on the trouble.

Though the cause of this disease had not been definitely established heretofore, veterinarians have been quite successful in treating the malady if they were called early enough, and when at all possible farmers are strongly advised to summon such professional aid as is available.

Symptoms.—Usually the first indication of trouble noticed by the owner is an unsteady gait upon taking the animal out to water. The appetite is usually good. Animal inclined to constipation. Eye congested. Flanks tucked up. Nervousness. In the later stages if the head is raised the horse may fall. Stands with the legs spread and has a distinctly intoxicated look. Greedy horses are most liable to attack.

Treatment.—The treatment recommended by Dr. S. F. Tolmie, of Victoria B.C., who has had a great deal of experience with such cases, is as follows :—Remove all ferny hay and bedding. Administer a good brisk purgative, such as : Barbardoes aloes seven drachms,

calomel one drachm, and ginger one drachm. Half-ounce doses of potassium bromide twice a day in the feed or drinking water. One to two drachms of potassium iodide three times a day is recommended. Give medicine in the feed or drinking water or with a syringe. Feed laxative food such as bran mash and carrots. Give enemas if necessary. When animal is very groggy place in slings with extreme care, avoiding excitement as much as possible. Tie with guy ropes on both sides, in front and behind. Slings should be applied so that the belt presses lightly on the abdomen when the animal is standing erect, but so that on the least flexion of the joints support will be given. In some cases cold packs to the head are recommended. Recovery after this form of treatment is the rule, but if begun too late, losses will occur. Care is needed in giving medicines to avoid unnecessary excitement, as rough handling will invariably aggravate the symptoms.

To the farmer who is unable to secure professional aid we would suggest the following treatment:—First remove all ferny hay and bedding. Give a quart of raw linseed oil, taking especial care that none falls into the lungs. Give good clean hay, warm bran mashes and roots. The horse should be kept as quiet as possible, owing to its nervous excitability. Warmth is of aid in combating the affection whilst a cold draughty stable tends to lower the vitality.

The Eradication of Bracken.—We have taken some pains to find out if there was any bulletin or other information on the subject. The only bulletin we can find dealing with this matter is one written by H. R. Cox, of the United States Department of Agriculture, entitled, "Eradication of ferns from pasture lands in the Eastern United States" (Farmers' Bulletin, 687). He recommends methods which can be used in the Eastern States and says that the Department of Agriculture has not investigated the fern problem in the West. Various methods have been tried, but the two that have given the best success are spraying with solutions of salt and cutting. Two treatments a year, either spraying or cutting, are advised. The best time to treat ferns is stated to be just before spring, or about the middle of June and the middle of August. Cutting is somewhat cheaper than spraying. In the East with ferns at an average thickness in a pasture a man ought to cover about $2\frac{1}{2}$ acres a day; in the West where the ferns grow much more vigorously the labour entailed would be greater. Probably the best method for the West would be a combination of cutting and choking out the fern with red clover, as a good stand of clover tends to weaken the fern. Since bracken has now been definitely proved to cause poisoning in horses, we would urge all farmers to make determined efforts to get rid of the plant and to keep all fodder containing it away from their horse stables, even in the shape of bedding.

Poisoning of Horses by the Common Bracken. 109

Acknowledgments.—We beg to acknowledge the valuable information given by Drs. Tolmie and Derby, especially as regards statistics and treatment of the affection. To Dr. F. Torrance, Veterinary Director General, we owe thanks for his interest in our investigation.

References.

- Chestnut, V. K.—1898. Preliminary catalogue of plants poisonous to stock. United States Department of Agriculture, B.A.L., 15th Annual Report, p. 398.
Hadwen, S., and Bruce, E. A.—1916. Preliminary communication before the B.C. Veterinary Association at Vancouver, B.C., December 6th, 1916.
Lander, G. D.—1912. Veterinary Toxicology, p. 272.
Pammel, L. H.—1911. Manual of Poisonous Plants, p. 317.
Pammel, L. H.—1917. American Journal of Veterinary Medicine, March.

ADDENDUM.

Fatalities Following the Ingestion of Green Bracken.—While we had heard indirectly that animals might suffer from eating green bracken, it was not until quite recently (October 1st, 1917) that any cases came directly under our notice.

Two horses owned in the village of Agassiz developed symptoms of narcotic poisoning while confined in a small pasture. The symptoms were exactly similar to the experimental cases recorded in this paper. When seen neither animal could stand, though earlier in the day they had been able to do so. The evidence as to the condition being brought about through the ingestion of green fern was indisputable. What grass was in the field had been nibbled so short that the animals were forced to eat the ferns. The most conclusive piece of evidence we found was the fact that the horses had been putting their heads through the wire fence, and that they had left nothing but the fern stalks within the area of their reach. Beyond this area was a green bank of fern. As stated before, the grass had been eaten bare all over the pasture, and the only other vegetation for the horses to eat was bracken, which was very plentiful.

One of the horses died after being down for three days, and the other recovered slowly. The treatment which had been given these animals was of a very rough character; apart from a preliminary dose of arecoline the animals received but little attention, though their food was changed.

We have stated that horses will only eat dried fern when forced to do so, and from the above it is apparent that the same thing applies to the green fern. The only exception to this rule may be that an otherwise well-fed animal will sometimes nibble at any green plant within reach.

S. HADWEN.
E. A. BRUCE.

EXPERIENCES OF A VETERINARY SERGEANT WITH A
VETERINARY HOSPITAL IN SALONICA AND SERVIA
IN 1915.

By SERGEANT MILLER.
Late Royal Army Veterinary Corps.

THE Hospital left Woolwich in June, 1915, and proceeded to Bulford for a few weeks. We were doing duty to help No. 4 Veterinary Hospital at Bulford till we got orders to proceed overseas. We left Devonport on the *Minnewaska* about the middle of July, 1915. Where we were going to nobody knew. Well, we set sail, and the first place we called at was Gibraltar. We arrived there after about 4 days' sail and had a good passage. When we set sail from Devonport we had some R. G. Artillery on board and we had to take charge of their horses. There was not much sickness, just a few pneumonia cases, and we only lost one horse all the way until we landed at Alexandria. We went on to Malta in another 4 days' sailing, with a good passage all the way. The submarines were the things we "got the wind up" about, because they were very troublesome at the time. We arrived at Alexandria after about three weeks' sail, and we thought that we were going to stop there. We stayed on the ship all night and the next morning had orders to disembark. We got off the boat that day and went to No. 11 Veterinary Hospital at Garbary Camp, just on the outskirts of Alexandria, when we had orders to embark for Salonica. We struck camp at 4 a.m., about the middle of October and marched to the docks for embarkation about 7 in the morning. We had to take 375 horses with us to Salonica on a boat called the *Cora*, which used to be a mail-boat, but had been made into a transport ship. The horses that we had to take were French Yeomanry horses, and a fine stamp of horses they were, as every horse that went on that ship cost £70 on the average. We got the horses on the boat the same day, and we were all ready for sailing that night at 7, but we got orders about 4.30 a.m. that we were not going out that night, for reasons we did not know then, but the next morning we got to know that the Captain had got orders not to proceed till we had a gun put on the forecastle and one aft, so we had to take the horses ashore again for another 7 days, until the guns were put on the ship. We laid on the shore for 7 days and had the horses picketed there. We had to exercise the horses about 3 a.m., as it was too hot through the day. It was a good job that we got the horses nice and fit for the sea voyage, because we had a terrible voyage. After 7 days, lying on the sea-shore, we got orders to embark again. We were glad when we got the orders, because it was not very pleasant lying out on the sand. We were all on board ready about four in the afternoon and left

about ten at night, and a fine night it was. When we awoke next morning we had got into the *Ægean Sea* ; we thought we were in luck again for fine weather, but our hopes were dashed to the ground about 1 o'clock that day, and we soon got to know what a storm was. We were just where four seas meet—the Sea of Marmora, *Ægean Sea*, Western Atlantic and the Mediterranean. We had our horses on board, and, as it was only a small ship we had had a job to get them all on. There were two decks down below, which held about 350. so we had to put temporary standings on the forecastle of the ship for the other 25. We had to sleep on deck or anywhere. The storm started at about 2 o'clock the next afternoon and it got worse as the afternoon went on, till at about 6 o'clock nobody was allowed on deck. It became terrible as the night went on. About midnight we thought of Old England, the land we had just left, and felt that our time had come ; but we put our trust in God and the captain of the ship. The storm kept up all through the night and the next morning it was no better, but about 2 that afternoon it went down suddenly, so much so that we could not believe it could possibly subside so sharply. The horses were the first things requiring our attention. On the lower decks there was a lot of sickness amongst them, but on the whole they had stood it well. It was a good job those horses were fit when they came on board ; that 7 days we had them on the shore at Alexandria was a grand thing, because they were got fit to stand the voyage, or else we might have lost more. The two lower decks had come through fairly well, but when we went on to the top deck, where we had made the temporary standings for the 25 horses, it was a terrible sight that met our eyes. The sea had been so rough that it had washed all the standings down. When we got half the wreckage off, we saw there were some horses still alive. There were 10 dead, so we had to see about the other fourteen. One of the horses had crawled under the legs of the others and had saved himself. Those poor animals lying there looked like drowned rats in a trap. We had to destroy all the rest with the exception of the one which, as I said crawled under the others and was saved. We had to get to work to put them overboard. We got the winches started and put them into the water. After another two days' sail we arrived in the Gulf of Salonica, and glad we were when we arrived. We got orders about 9 p.m. that the horses had to be got off that night to go up country, so we had to start to get them off at once. When we got started, we were not long in getting them off, disembarking the last about midnight. We had to get the horses up the country and they had to go about 40 miles by road, and bad roads they were, too. After we had got rid of the horses we had to come back to the docks, as we had all

our stores and transports and all the men at the docks. We disembarked two days after we landed. We got motors and loaded them up and off we started up country, where we had to pitch camp about 10 miles up. We stopped there two days. The only rations we had were bully beef and biscuits, but everybody was cheery; the officers had just the same hardships, but we all pegged in together and were as happy as we could make ourselves. We stopped there for two days, when we got orders to move further up. We had some awful weather, as it was terribly cold. December and January are two awful months in Greece, and we found it very cold after being in the climate of Egypt. We got the hospital started and we got the ground for it. It was very wet and we were lying in rushes; the hospital was on the same piece of ground and the cold was awful. We soon started receiving horses and mules—mostly mules—and we had to go up and bring them down. It was awful bringing them down through the hills as there were no roads. If we had horses sick and unable to travel, the only thing we could do was to shoot them and bury them on the road. We could not get ambulances as there were no roads, and the Engineers had only just come on the scene to make them.

SOME EXPERIENCES WITH A MOBILE VETERINARY SECTION IN THE DARDANELLES IN 1915.

By SERGEANT SPENCER

Late Royal Army Veterinary Corps.

LEAVING Alexandria on July 4th, 1915, with a draft of men, I was ordered to join a Veterinary Hospital Section which had been on the Dardanelles Peninsula doing duty for some time previously.

We landed amidst the noise of shot and shell in a country which in time of peace would be anything but beautiful, hilly and rugged, devoid of all trees and herbage; a shortage of water, and the soil of which was a burning sand.

Our forts occupied a stretch of land about four miles of frontage in our first line trenches, with a depth of three miles in the rear of the sea, and in all, five lines of trenches.

Our headquarters were close to the sea coast, about half a mile from Saddle Bar, this village being in ruins, also within sight of the Cape Helles Lighthouse, which I saw demolished by gunfire from the *Queen Elizabeth*. We had a very good view into Asia Minor. Our work, which was carried out continually under shell fire, mostly consisted of attending to the wounded and sick horses for the ammunition and general transport. Many cases had to be attended and watered right up in the front line of trenches. The horses were only watered once

in the 24 hours and often as early as 4 o'clock in the morning, owing to the water being very scarce and the very difficult conditions of getting it to the needed places. I can say that we were really only safe when in the dugouts. We had many wounded and sick horses killed by shrapnel when under treatment, besides suffering several losses amongst my comrades at different times. My stay in the Peninsula lasted over a period of four months and before my leaving all the horses were replaced by Indian pack-mules.

Before concluding this, I should like to add one incident that I shall never forget, and that was the dreadful sight of the sinking of the *Majestic*, which before my leaving was showing about 8 to 10 feet out and above water.

I was eventually sent sick to Alexandria and invalided home to England early in December.

ACORN POISONING.

By L. W. WYNN LLOYD, M.R.C.V.S.,
(*Carmarvon.*)

IN December, 1917, Mr. E. H. Pratt, of Northallerton, contributed to a contemporary journal, under the heading, "Undiagnosed," a record of cases of an obscure complaint in young horses. Mr. Jas. Brown, of Ramsey, I.O.M., replied with a description of similar cases seen by him. This was followed by a note in the next issue by me on several cases of the same nature.

The symptoms in the average animal were :—Temperature variable—ranging from 99° to 104° F. Pulse accelerated and feeble. Injected mucus membranes. Muscular tremors in most cases. Inability to stand for any length of time and later complete prostration. Obstinate constipation. The fæces dark coloured and often coated with mucus. Urine dark coffee-coloured and flaky, leaving a considerable mucus sediment when allowed to stand in a test tube.

Autopsies were disappointing. No intestinal lesions. Nephritis in nearly all cases and always a quantity of dark-coloured urine in the bladder. Partly digested acorns in stomach and intestines.

In concluding my note at that time, I said :—" Four conditions were common to all my cases :—

1. They were all females (I have since seen males affected).
2. They were out night and day in winter.
3. None were plethoric animals and they graze on poor land.
4. The pastures had a number of oak trees on and around them.

" What can be the cause and nature of this condition ? In view of our present meagre knowledge of the pathology of azoturia, would it not be reasonable to suggest that these animals suffered from a form

of this disease? Would ingestion of acorns cause the blood to become surcharged with proteids and bring about the lesions—the tannin causing the constipation? ”

Since writing the note just quoted, I have seen several other cases—three this winter. The last one, an aged mare, recovered after about a week's treatment with cathartics, frequent enemata, stimulants, injections of strychnine, etc. I am now convinced that I have been dealing with acorn poisoning. There is evidence in almost every instance that the animal had eaten a quantity of them. The pastures were bare and poor and the acorns fall in great numbers at that season (November to January).

A sample of urine from one case was sent to Prof. Ramsden, of the Bio-chemical Laboratory, Liverpool University, with a brief history and a suggestion that acorns might have caused the mischief. He very kindly examined the urine and I give his report.

Bio-chemical Laboratory,

Dear Sir, The University of Liverpool. 30.10.19.

At your request I am reporting to you the result of my examination of the urine of a filly recently dead, under circumstances suggesting that consumption of acorns was responsible for the death.

The urine contains much hæmoglobin—about as much as in 50 times diluted blood. No red corpuscles, therefore the hæmoglobin has presumably passed the kidneys already in solution and there has been considerable hæmolysis inside the blood vessels—a sort of “black-water” urine.

Albumin is plentiful. There is also a strong glycosuria—as much as 1.7 per cent. of glucose. These findings would, in a man, strongly suggest poisoning by foodstuffs rather than by parasitic or bacterial invasion—the combination of glycosuria and hæmoglobinuria, I mean. Whether they have this significance in a horse, my knowledge does not justify me in expressing an opinion.

As regards the acorns submitted, they were not invaded by moulds or other parasites. I have not succeeded in discovering any investigations on acorns in the literature or any reference to their being poisonous. But I hope to cover a larger area and if I find anything significant will let you know.—Yours faithfully, W. RAMSDEN.

Translations and Abstracts.

STERILITY OF THE HE-GOAT.

CONTRARY to what one observes in other races, and notably in bovines, sterility of the he-goat is more frequent than that of the she-goat. This sterility is partial and temporary, or complete and permanent.

Sterility is partial and temporary—(1) when the he-goat is weakened by illness ; (2) when he is insufficiently nourished ; (3) when he covers too large a number of females ; (4) in certain cases of onanism. The sexual aptitudes of a he-goat are very variable and there are some examples of exceptional vigour. One Flemish " billy " covered 17 she-goats in a single day and 350 during the season ; in every case fecundity was obtained at once. Sterility is complete and permanent :—

1. In cryptorchidism and hermaphroditism.
2. In obstruction of the seminiferous canals.

The first-named anomalies are more frequent than in the case of the stallion and the bull ; they are transmitted by heredity. The most common cause of permanent sterility is obstruction of the seminiferous canals (22 cases out of 25 investigated). This is due to thickening of the canals of the testicles, of the epididymis or to occlusion, most frequently a combination of all three. The ailment is difficult to recognise at first, but later on the testicles become slack and shrivelled. The spermatic fluid does not contain spermatozoa and its examination constitutes the best method of diagnosis. Sterility of the he-goat is prevalent in all countries ; in Germany it is chiefly observed in the Kingdom of Hesse. It is wise to always make special enquiries as to the stock-getting record of new purchases, and in case of failure to fructify, to make a systematic examination of the spermatic fluid.

Revue Gén. de Méd. Vet.

G. M.

FORMALIN IN THE TREATMENT OF MASTITIS.*

By J. N. FROST.

(Professor of Surgery, Cornwall University Veterinary School, U.S.A.)

For our purpose we will divide mastitis into two groups, particularly as to cause : first, mastitis caused by infection of various forms ; second, mastitis due to other causes than infection. It is of the first group that we wish to speak.

In attempting to overcome the infection I had used the injection of boric acid solution, also oxygen gas, without satisfactory results. I had tried the injection of equal parts of alcohol and glycerin as recommended by Schmidt of Denmark. This likewise was not satisfactory and in some cases seemed to increase the infection.

In treating diseases of the respiratory and genito-urinary tract we use antiseptics which, given per mouth, are eliminated through these tracts. Why, then, should we not treat infection of the udder in the same way ?

In reporting for the committee on therapeutics at the 1914 meeting of the New York State Veterinary Medical Society, I reported the good results obtained by feeding methylene blue in cases of mild

infection of the udder. I also used methylene blue in combination with turpentine, which is likewise eliminated through the milk.

At the 1913 meeting of the American Veterinary Medical Association, Dr. Klein gave a paper on "The Therapeutics of Parenchymatous Mastitis," in which he tells of using boric acid per mouth and finding it in the milk in twelve hours. He also speaks of using urotropin and finding formaldehyde in the milk in twenty-four hours.

At the conference last year Dr. Moak, in speaking of streptococcic mastitis, gave the impression that it was incurable, but later, in speaking with him I was unable to find any definite line of treatment which he had used. I had already cured some cases of streptococcic mastitis with turpentine and methylene blue, but realised that something stronger was needed.

It was then I decided to try formalin, and the results were so gratifying in the first case that I began a series of experiments with regard to elimination and dosage.

Quitman gives the dose for the cow as 15 to 30 minims and advises not to continue the use over too long a period, as it is supposed to lessen or dry up the secretions from the gastric and intestinal glands and thus produce constipation or impaction.

With the idea of avoiding this we began with the dosage at one dram three times a day and alternated with one ounce of turpentine twice daily. As this produced no bad effects we gradually increased the dosage until we believe the correct dose to be one ounce daily.

We have given 25 c.c. twice daily for two weeks and failed to see that it has produced bad effects in any way, either by loss of appetite, constipation or impaction. This cow at the time was being fed on dry hay and grain. We have also given 50 c.c. at one time without bad effect.

As to the method of administration we have given it undiluted in capsule. It may also be given in milk or oil. In combination with the latter we get the laxative effect of the oil, which would be beneficial in treating mastitis.

ELIMINATION: In determining the length of time after giving formalin before it was excreted in the milk we used Leach's hydrochloric acid test for formalin. When one dram of formalin was given faint traces could be found in the milk in twenty-four hours. When 25 c.c. of formalin was given three hours after water and seven hours after milking, it was found in the milk two hours afterwards, and continued to be present for forty-eight hours. The largest amount was present from the eighteenth to the thirtieth hours.

We believe it advisable to supplement the formalin treatment with purgatives and diuretics, as they increase the interchange of blood in

the udder and hasten the elimination of waste products from the body. It is also well to use the suspensory bandage to relieve the weight and tension on the tissues. Then by placing cotton inside the bandage and keeping it hot by applying water the pain in the udder is materially reduced. When left for the night the wet pack should be changed for a dry one to prevent the chilling of the udder. In hot weather cold water may be used in place of hot with equally good results.

In our work with formalin we have not used the above methods except in two cases where the animal was necessarily changed from ensilage to dry hay and in these cases salts were given to relieve any constipation which might result.

In giving the results of our work with formalin, we give one from each of the different forms with which we have been experimenting.

CASE I. Cow had calved eight months previously and was pregnant about four months. For the past two weeks she had given thick milk and the two posterior quarters were hard and firm. Cultures made from the milk of this cow were sterile from the fore-quarters and from the hind-quarters showed a pure growth of streptococci. The animal had been treated with home remedies and cow relief.

Gave one-half ounce of formalin and then followed by one dram dose three times daily, alternated with one ounce of turpentine twice daily. Eight days later the treatment was discontinued and on the ninth day cultures from the milk of all quarters were sterile. Five months later, after the cow had again freshened the cultures were again sterile and the animal averaged over one hundred pounds of milk daily for forty days.

CASE II. Cow had calved about four months previously and had been giving thick milk for five days. Cultures from the milk gave pure growth of streptococci from one quarter, mixed growth from another, a pure growth of micrococci from the third and a sterile culture from the fourth. Gave one-half ounce formalin, followed by one dram three times daily for five days. Cultures made from the milk on the ninth day were sterile.

CASE III. Cow had freshened four days before and had retained placenta. Was giving bloody milk from two posterior quarters. Cultures showed *B. coli* and micrococci. Gave twenty-five c.c. of formalin and repeated for three days. On the sixth day the milk was normal.

CASE IV. About one year ago cow had shown a small swelling at base of teat. Two weeks previous to our treatment the swelling had suddenly increased in size and at time of treatment was about three inches in diameter. The swelling was punctuated with a hypodermic needle and a thin straw-coloured fluid escaped. Cultures

from this revealed pure growth of streptococci. Cultures from the milk of that quarter showed no growth. The abscess was opened and packed with iodoform gauze; the wound covered with sterile gauze held in place by adhesive tape. The second day after the abscess was opened the milk from that quarter became thick. Cultures from that quarter showed streptococci, which had undoubtedly passed up the milk canal. Gave twenty-five c.c. of formalin and on the third day the milk was normal to all appearances but no cultures were made. Ten days later the milk became thick and cultures showed a growth of streptococci. This time twenty-five c.c. was continued daily for three days and on the fifth day the milk appeared normal and cultures were sterile.

CASE V. Cow had been milking hard for a few days and the trouble was gradually increasing. A small amount of exudate was found on end of teat, forming a scab. After removing the exudate the external orifice was found to be normal. Further examination showed a small swelling in the teat canal, at the upper end, which was producing stenosis of the teat and causing hard milking. Cultures from the milk of this quarter showed micrococci and *B. coli*. Gave twenty-five c.c. of formalin and repeated in twenty-four hours. Also painted the base of the teat with tr. iodine and had the exudate on the end of the teat softened with warm antiseptic solution before each milking. Four days after the owner reported that the exudate had stopped forming and the milk was flowing more easily. Two weeks later he reported the cow milking very well.

Much credit is due to Dr. Pickens for making and examining the cultures and also to Dr. Hayden for testing the milk for formalin.

Summarising the above briefly :—

1. Give a good dose of salts to start things and in the saline solution let there be an ounce of formalin (40%).
2. Give 1 oz. of formalin in a quart of water as a drench B.I.D.
3. *Keep the quarters milked out all the time* and allow client to use all the liniment he wants.

(Journal of the American Veterinary Medical Association.)

Personal.

CONGRATULATIONS to Mr. Frederick Bullock, F.R.G.S., the indefatigable Secretary of the Council of the Royal College of Veterinary Surgeons, on the French decoration of "Officier" of the Order of Nichan-Iftikhar. This decoration, which has been conferred on the recommendation of the Bey of Tunis, is one bestowed by the French Government for distinguished work in connection with Tunisian affairs, and the grade of "Officier" is a high one. It may not be known to

the profession generally, but Mr. Bullock is a linguist of no mean order, and well known in certain literary circles. It is good to see that the French Government have singled him out for recognition in this way.

Our readers will congratulate Mr. Edward McSwiney, M.R.C.V.S., of Cork, on the brave defence he made when his house was attacked by Sinn Feiners. His cowardly assailants suffered severely for their temerity, as Mr. McSwiney used his revolver with some effect. Unfortunately he himself was badly shot in the right arm, and this has since had to be amputated below the elbow. The latest report from hospital is, however, that he is quite out of danger and making excellent progress.

At the last meeting (the first since the war) of the Société Centrale de Médecine Vétérinaire, held in Paris, Major-General Sir John Moore, C.B., K.C.M.G., F.R.C.V.S., and Major Frederick Hobday, C.M.G., F.R.C.V.S., F.R.S.E., were elected as Foreign Corresponding Members.

The Ministry of Agriculture has appointed the following eminent pathologists as a Scientific Committee to investigate Foot and Mouth Disease: Professor Robert Muir, Professor of Pathology, University of Glasgow (Chairman); Sir John McFadyean, Principal and Professor of Pathology, Royal Veterinary College, Camden Town; Lieutenant-Colonel C. J. Martin, Director of the Lister Institute of Preventative Medicine and Professor of Experimental Pathology, University of London; Mr. Clifford Dobell, Protistologist to the Medical Research Committee and Assistant Professor of Protistology and Cytology, Imperial College of Science; Professor J. M. Beattie, Professor of Bacteriology, University of Liverpool, and Dean of the Medical Faculty, University of Liverpool; and Sir Stewart Stockman, Chief Veterinary Officer of the Ministry of Agriculture. Between January 1st and February 23rd of this year, it was stated in Parliament by Lord Strachie, on the evening of March 4th, that there had been 33 outbreaks of Foot and Mouth Disease altogether, and 1,636 animals had been slaughtered; and the Earl of Crawford on the same occasion said that since January 9th, 1919, outbreaks had occurred in 24 counties, 115 separate premises being affected.

Review.

DEPARTMENT OF AGRICULTURE, CANADA: REPORT OF THE VETERINARY DIRECTOR GENERAL (F. TORRANCE, B.A., D.V.S.), FOR THE YEAR ENDING MARCH 31, 1918. Printed by J. de Labroquerie Taché, Ottawa, 1919.

This Report gives evidence of grand work done despite absence on military service of a number of veterinary inspectors. The meat.

and canned food industry has extended and prospered, and oleo-margarine manufacture has been commenced. Contagious pleuropneumonia, and foot and mouth disease are still unknown in Canada. Glanders, hog cholera, and dourine (thanks to the complementary fixative test) all showed a marked decline. Sheep scab is practically unknown, only five cases occurring in Manitoba. Cattle mange has caused some trouble in Saskatchewan and Southern Alberta.

There has been an extension in municipal testing for the control of tuberculosis, and the regulations now apply to any city or town applying for federal aid. Compensation has been raised to two-thirds the appraised value of the animal from one-third formerly.

Experiments have proved that young pigs fed on tuberculous milk become tuberculous to the extent of 80 per cent., and if fed thus continuously for a month 100 per cent. become infected. In some cases in Canada it was found that herds were supplying milk to be consumed in the raw unpasteurised state where almost every cow in the herd was diseased. The danger to the children of the country was very obvious, for there is no reason to believe that they are less susceptible to the effect of consuming tuberculous milk than in the case of the pig. The good done is evidenced by the fact that since measures against tuberculosis were instituted over 700 diseased cows have been removed from the dairies supplying the cities and towns. In Saskatoon, Regina, North Battleford, and Ottawa tuberculin testing has been largely carried out with very gratifying results. The Biological Laboratory at Ottawa has had a very busy year—50,000 doses of tuberculin and mallein have been manufactured at the Laboratory and given away. In addition to the investigation and diagnosis of animal diseases invaluable aid has been rendered to the Field Veterinary Division, the Meat and Canned Foods Division, and to the farmers of Canada at large through examination of specimens submitted for diagnosis.

Twenty-six candidates passed the meat inspection examination and fourteen took service in the Meat Inspection Division. The construction and equipment of the packing-houses have been greatly improved during the year; 90,226 more cattle were slaughtered than in the preceding year, and only 1.07 per cent. of these carcasses were condemned.

G. M.

NOTICES.

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THE
VETERINARY JOURNAL

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Sub-Editor :

GLADSTONE MAYALL, M.R.C.V.S.

APRIL, 1920.

Editorial.

GLANDERS IN MAN.

ALTHOUGH glanders, fortunately, does not occur very frequently in man, the danger is never to be lost sight of by those whose lives are spent amongst the equine tribe; and the case of a veterinary officer, whose death from this disease was recently reported in *The Lancet*, is abstracted on a subsequent page of this issue of THE VETERINARY JOURNAL as a reminder of one of the serious risks incurred by those who follow our profession. It speaks well for the precautions taken, in the form of lectures and warnings given, by the Veterinary Service during the past war that no cases of the kind occurred amongst the thousands of men employed in the care of the horses and mules.

It stands out as a useful lesson of the value of the dissemination of knowledge, for although comparatively few knew anything about horse management at the commencement, they were only amongst their animals a few days before they understood the danger that *might* be lurking behind a nasal discharge, and such was reported at once.

The difficulty of diagnosis in man was, as is not unusual in glanders, typically exemplified in this case. The bacteriological reports were

negative, and it was only "in view of the profession of the patient, and as he had been employed in the manufacture of mallein," that glanders was considered. On this point, the diagnosis question, we have, in the use of mallein, a great advantage over our medical *confreres*, and it is a thousand pities that this agent (or some other of like efficiency) cannot be manipulated as a test for this obscure disease in the human subject in the same way as it is used in veterinary diagnosis for glanders in the horse and mule.

BOWEL SURGERY IN THE HORSE.

PROFESSOR GHISLENI's article, translated from the Italian and published in this month's issue, is of exceptional interest because it indicates a stage of progress in the abdominal surgery of the horse in that a very large calculus was removed from the large intestine and the patient recovered. The calculus, in this case, lay in the cæcum, which rendered the task a little less difficult than if it had been in the large colon, but even in this situation the risk attending a surgical removal was well nigh insuperable, and it is questionable if this operation can possibly be repeated many times with success.

To operate upon the small intestine is a comparatively easy matter, but, unfortunately, calculi in the horse are never found here. In the smaller animals, especially the dog and cat, foreign bodies have been extracted satisfactorily scores of times, and from all parts of the intestine, but with the horse it is different, and our esteemed colleague, Professor Ghisleni, is to be warmly congratulated on the lead he has given us.

Original Communications.

TREATMENT OF MANGE AND LICE.

By HAMILTON KIRK, CAPT., R.A.V.C.
(*E.A. Divisional Veterinary Hospital, Huntingdon.*)

IN August, 1917, I wrote an article on this subject to the *Veterinary News* from France. In discoursing further on this disease I must confess to a certain modification of my views, as I have since been on Home Service, where the methods of treating skin disease appear to be somewhat divergent from those obtaining in France. There we were almost solely confined to the calcium sulphide dip, of which I was a strong advocate in 1917. It certainly did effect a cure, but I realise it was too slow a process to be really economical, although its cost was small in comparison with oily dressings. A certain proprietary arsenical dip has been extensively used in some hospitals at home, but my experience with it has not impressed me with its

efficacy as a cure for diagnosed mange. In fact, I made some experiments which gave decidedly poor results. The first was the spraying of a dung heap (which was black with flies) for half an hour, using a 1 per cent. solution and taking care that every square inch was thoroughly wetted. Even flies that were purposely caught and held in the spray for two minutes recovered and walked away after 20 minutes. This was repeated three hours later, and in the afternoon the manure heap was just as thickly covered with flies as ever, nor could I find any dead ones. I next submerged 20 lice (*Hæmatopinus pilosus*) in a watch glass containing a 1 in 80 solution of Cooper's Dip, and for ten minutes they were all still alive. Owing to my being called away, they were removed and placed in a dry crucible where they were found dead next morning. Seventeen (*Hæmatopinus pilosus*) lice were placed in a 1-150 solution of dip, and all appeared dead at the end of 14 minutes, but half an hour after removal into the dry, six showed signs of recovery, and 2½ hours later two were still alive, one had crawled away, and the rest were dead. The strength of solution used for this test was the same as that used upon horses, but it must be remembered that a louse in its natural environment has a much better chance of escaping the effects of dressing than it has upon a slide, and if it can live 14 minutes in total submersion, how long would it live on a horse's skin, which rapidly dries. Yesterday I placed a live Psoropt in a drop of the dip on a slide (strength 1-80) and for four minutes it was alive, then becoming quiescent. It was removed to a dry slide, and an hour and a half afterwards still showed no sign of life. Another Psoropt was placed in a 1-150 solution, and lived for 45 minutes, never afterwards recovering. I leave your readers to draw their own conclusions from these experiments.

I stated in my previous article that the oily dressing, though good in itself, was a blistering agent, and would probably be too expensive for wholesale use, and though these statements are true to-day, they bear modification. Mr. Maurice Hall, Ph.D., in his very exhaustive article on the "Control of Lice," quotes me as having asserted that horse fat will not blister a horse's skin, and complains that in consequence he dressed 14 horses with a mixture of horse fat, linseed oil, and coal-tar creosote oil, and left it on for several days, with the result that the horses lost a considerable amount of hair. In the first place, I did not say that linseed oil or coal-tar creosote oil would not blister, nor does Mr. Hall state whether he took any steps to purify the fat before application. In any case, to leave it on for several days was rather inviting trouble, though he may have been misled by what I said. Captain Barron, A.V.C., has lately revived interest in horse fat dressings for mange, and claims most

excellent results. For the last nine weeks I have been successfully employing precisely the same treatment, which is as follows :—Horse fat is boiled in water, to which has been added Sodæ Bicarb. (to neutralise any acids in the fat) for two hours. It is then skimmed off and the process repeated in fresh water. Skim off again and add Sulph. Sub. 1 part to six of fat, and about two ounces Boric Acid per five gallons as a preservative. Any fat or oil which is applied rancid or impure, or becomes rancid while *in situ*, will assuredly blister the skin. This dressing is applied at blood heat with a cloth, from the tips of the ears to the coronets, and then scrubbed in with a dandy brush. On the following day the horse is thoroughly hand-rubbed, whilst on the third day it is carefully washed and scrubbed with hot water and soap. Naturally a large amount of soap is required to wash greasy horses well, and as this is now a scarce commodity, every expedient must be used to ensure its economical use. Two of the greatest of these are : (1) the production of a profuse perspiration of the horse before commencing to wash, and (2) the use of washing soda in the water. Captain Barron claims that one dressing will often effect a cure, but that if any itchiness remains, a second or even third dressing may be applied, though three are rarely ever required. Thoroughness is the key-note of success, and the observance of detail and cleanliness of paramount importance. I have given the method a good trial and am highly satisfied with the results, for the skin is rendered soft and pliable and no blistering ensues. I might, however, mention in passing, that if a dressed horse is permitted to be exposed to the sun, depilatory effects will follow, and the same misfortune occurs if the dressing is left on too long, or is applied without previous purification. Hall remarks that I made no mention in my article as to the efficacy of horsefat for lice. Three sucking lice were placed in a drop of fat and sulphur dressing (as used for mange) and in four minutes two were dead, the other expiring in five minutes. Upon being removed to a dry slide they did not recover. I have never observed lice to reappear on a horse after it had been dressed with horsefat and sulphur, thus proving that the dressing does have a decidedly derogative effect on the nits, a much more decided effect than arsenical dip. I quite agree with Mr. Hall when he states that a greased horse will be more susceptible to cold than a dry one. This is undoubtedly the case, and horses so treated should be protected as much as possible from cold or wind, preferably in a building, and not by the use of rugs. With a fairly constant average of 90 skin cases in my mange lines, I was able to discharge 64 between August 1st and 21st with this treatment, though only 15 of these were definite cases of purely Psoroptic and Sarcoptic mange, 31 being negative,

7 forage acari, 4 lice, 2 ringworm, 2 Psoropt and forage acari, 2 psoropt and lice, and 1 ringworm and forage acarus. This, however, does not conclusively prove that those diagnosed as negative or forage acarus cases, have not also got scabies. Certain it is that a large number of negative cases take just as long to cure as the psoroptic cases, as proved by the following :—

Average time required to cure Psoropts ..	24½ days
" " " " Negatives ..	23 "
" " " " Forage acari	22½ "

At first glance 22½ days for curing forage acari seems far too long, but as I said before, I am convinced that in many cases something more exists 'in their skins, although it is not always discovered. Many psoroptic cases have been cured in less than 24 days, whilst my minimum time so far is 12 days, and this, I think, speaks very well for the method of treatment now in vogue. Complaints have often been heard that horses discharged as cured of mange have later been returned as still affected.

This is explained, in my opinion, by the fact that the horse on discharge has a live egg on its skin, which, of course, cannot be clinically discovered, and the animal might be scraped all over before it could be found microscopically. A veterinary officer can only base his opinion upon what he sees, and it would be quite impossible to say that an egg did not exist. Then there is always the possibility that after leaving hospital a horse may become reinfected. I have noticed in the few cases that have been returned to me (not more than 5 per cent.) the period elapsing before their readmittance has been three weeks to a month, which seems to prove that a month is the time required for an egg to hatch out and mature and cause irritation.

Sarcoptic mange is only seldom found in this hospital, and demodectic is very rare. I have only seen two cases of Follicular in the horse during my service in the army, and the lesions produced were moist raised bumps all over the body, and very much resembling Acne. It has so far been too rare to permit of any experiments being made, or any information being gained as to its degree of infectivity. The last case that passed through my sub-division was a mixed infection of sarcoptic and demodectic mange, and it remained 41 days before discharge, the treatment being horsefat and sulphur. Mr. Hall asserts that the fumigation with SO₂, as advocated in the French Army, is a dependable method of dealing with lice, but I am afraid my experiences in France with this treatment have led me to quite the reverse conclusion. Ten cubicles were especially built at No. 12 Veterinary Hospital to test this method of treating scabies, and I was deputed to carry out experiments. Only psoroptic cases were

chosen for these tests, as the psoropt does not burrow. Ten horses were exposed to the gas for two hours, their faces alone being in the open air, and at the end of the time, live lice were actually found upon them, whilst in scraping we found live psoropts. The process was repeated two days later with the same results, and upon a third occasion using a stronger concentration of gas than that recommended by the inventor, we fared no better. As regards the best treatments for lice, those I favour are, in this order :—

1. Horse fat and sulphur dressing.
2. Singeing, followed by washing with Jeyes' fluid.
3. Sponging with a 33 per cent. solution of glacial acetic acid.

All of these methods directly affect the egg as well as killing the louse, but they must be preceded by clipping.

GLYCYPHAGUS DOMESTICUS DE GEER, AN ACCIDENTAL
PARASITE IN THE EAR OF THE DOMESTICATED RABBIT.

By A. W. NOEL PILLERS, F.R.C.V.S.

ON March 16, 1920, I received two slides upon which were mounted several specimens of mites, stated to have been taken from the inside of a tame rabbit's ear by Mr. C. J. Davies.* I have examined material from rabbits' ears on many occasions and have frequently come across the auricular psoropt *Psoroptes communis cuniculi*. In this case, however, it was easy to see that the specimens did not belong to any of the mange-producing genera. On comparing them with the figures given in Michael¹ and contrasting them with mounted specimens of *Glycyphagus spinipes*, I found them to be *Glycyphagus domesticus*. These two species are somewhat similar, and going over the matter with Prof. R. Newstead, F.R.S., he informed me that in his experience the former species was by far the commoner as a grain pest, and the latter extremely rare.

Rather than enter into a detailed description, I have added a photo of a mite from the ear, Fig. 1, and also copies of the male and female from Michael, Figs. 2 and 3. They are, however, about half a millimetre long and just visible when moving among their food. All the characters by which the mange mites are known are naturally wanting. In the photos the tubular bursa copulatrix at the posterior border of the abdomen of the female, and the very fine hairs which clothe the larger dorsal ones, can easily be made out. Like a number of allied mites the life cycle of this species contains a hypopial stage. As will be seen from Fig. 4 it is extremely rudimentary.

The adults of the family Tyroglyphidæ, to which the mite under

* See Mr. Davies' article on the "Canker of the Ear in Rabbits" on page 86 of THE VETERINARY JOURNAL for March, 1920.

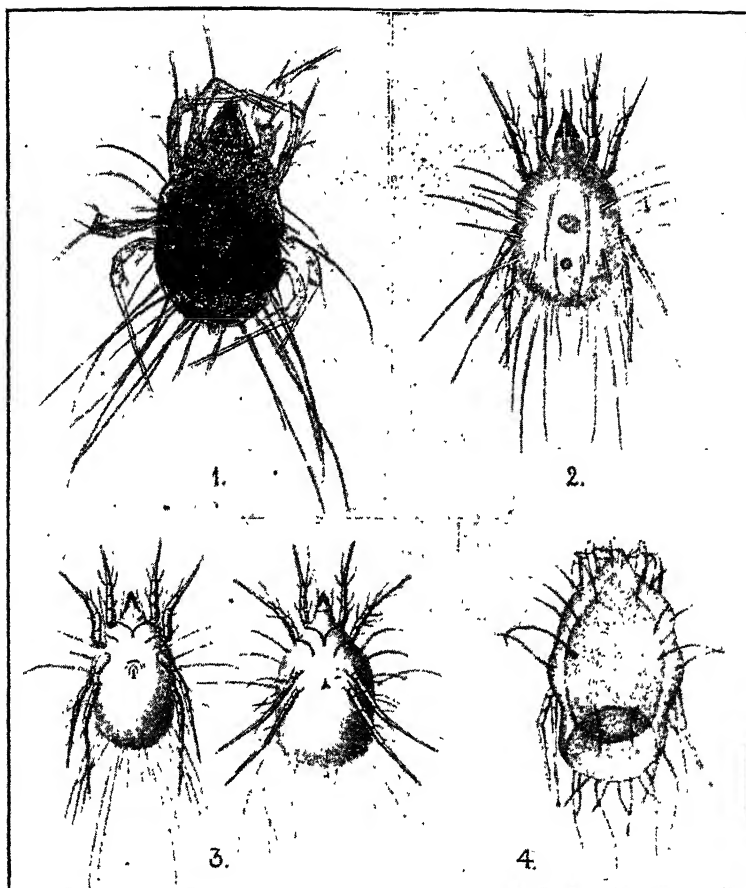


FIG. 1.—*Glycyphagus domesticus*, Female, dorsal aspect. From rabbit's ear. $\times 72$.

FIG. 2.—*Glycyphagus domesticus*, Female, dorsal aspect (Michael). $\times 68$.

FIG. 3.—*Glycyphagus domesticus*, Left Male. Right Female; ventral aspect (Michael). $\times 62$.

FIG. 4.—*Glycyphagus domesticus*. Hypopus, dorsal aspect (Michael). $\times 125$.

consideration belongs, are in the adult stages usually non-parasitic.

Michael (loc cit) gives the following synonymy :—

Acarus domesticus de Geer, Gmellin and Canestrini, and Fanzago.

Acarus siro Koch.

Glycyphagus cursor Gervais and Fumouze, and Robin.

? *Sarcoptes hippopodus* Hering.

? *Glycyphagus hippopodus* Gervais.

? *Glycyphagus prunorum* Hering.

Glycyphagus domesticus is stated to be common inside houses and buildings, upon all kinds of dried animal and vegetable matter, such as hay, fodders, dried fruits, drugs of vegetable origin and numerous materials of a sugary nature. It has been found in rush furniture, cork and even tobacco. Theobald² states that sugar merchants and grocers are frequently troubled with swarms of this species, which cause the irritating temporary affection known as "grocers' itch." Raillet³ says that it was probably this species which Hering found in the foot of a horse affected with canker, and which he regarded as proper to this affection; he made a new species of sarcopt of it under the name of *Sarcoptes hippopodus*. Garnett⁴ relates the finding of this species among the scabs and parasites of a case of sheep scab. There are a number of other references to the mite upon man and animals, but the above bear most closely upon the possibility of the production of an animal skin lesion by it.

A case such as this emphasises the importance of a knowledge of the mange mites and their allies.

REFERENCES.

- 1—Michael, A. D., British Tyroglyphidæ, Vol. I, p. 238 and Pl. VI. Ray Society, London, 1901.
- 2—Theobald, F. V., in The Animal Parasites of Man,—Fantham, Stephens and Theobald, p. 513. London, 1916.
- 3—Raillet, A., Traité de Zoologie médicale et agricole, p. 688. 2 ième Edition. Paris, 1895
- 4—Garnett, F. W., *Glycyphagus domesticus*—a non-pathogenic acarid accidentally present in a case of sheep scab. Journal of Comp. Path. and Ther., Vol. XV, p. 367. London, 1902.

ANKYLOSTOMA CEYLANICUM IN THE CAT IN DURBAN.*

By B. BLACKLOCK.

MATERIAL from Durban was sent by Dr. F. G. Cawston on 10th June, 1919, with the following notes :—

"*Ankylostoma duodenale* from a cat in Durban. The gut also contained a tapeworm, and death seems to have been caused by the numerous *Ankylostoma*."

The material consisted of ten female worms, of which nine were complete and in a good state of preservation.

*From the *Annals of Tropical Medicine and Parasitology*. Vol. XIII, No. 3.

It is not possible in the absence of specimens to describe the characters of the male bursa, but the general appearance of the females, the measurements and the arrangement of the chitinous buccal capsule and teeth have been studied.

Of the nine complete specimens the minimum length is 7.0 mm., the maximum 9.5 mm., the average 8.3 mm. The arrangement of the teeth is characteristic. There is a pair of large ventral teeth and also a very small pair situated at the base of these on a deeper plane. The measurements and mouth structure are, in fact, such that this parasite cannot be distinguished from *A. ceylanicum* (Looss). This parasite was recorded by Yorke and Blacklock (1915) in seven dogs in Sierra Leone, and was further referred to by them (1917) subsequent to Macfie's discovery of the same parasite in four of ten dogs at Accra (1916).

That this parasite should be found in Durban is of interest, more especially so if, as Dr. Cawston surmises, it should be the cause there of fatal disease in cats.

REFERENCES.

- MACFIE, J. W. S. (1916). Report of the Accra Laboratory for the year 1916.
YORKE AND BLACKLOCK (1915). Ankylostomiasis in Dogs in Sierra Leone.
Ann. Trop. Med. & Parasitol., Vol. IX, p. 425.
——— (1917). The Occurrence of *Ankylostoma ceylanicum* in West African Dogs.
Ann. Trop. Med. & Parasitol., Vol. XI, p. 69.

ON THE DIAGNOSIS AND SURGICAL TREATMENT OF INTESTINAL CALCULI IN SOLIPEDS.*

LAPARO-ENTEROTOMY IN A MARE.—RECOVERY AND CURE.

By PROF. PIETRO GHISLENI.

Professor of Surgery, Turin Veterinary School.

THE etiology of intestinal calculi in solipeds appears to us very interesting, considered not merely from the point of view of the usual medical, symptomatic, drastic treatment, or with the certainty of fatal termination, but also from the aspect of operative surgery, the present-day resources of which can successfully ensure direct intervention, even though it may appear difficult and daring.

The case I am about to present to my colleagues deserves to be known because :

1.—It was first decided to perform laparotomy, followed by laparo-enterotomy on a mare, fifteen years old, affected by an enormous calculus weighing 7 kilos, 845 grammes, the operation being quite successful and recovery perfect ;

2.—Because at the only examination made, diagnosis of the

*Translated by H. L. Somers, Capt., R.A.V.C.

calculus was possible by simple inspection and external palpation—this is considered a more than rare clinical exception; no other writer has hitherto been able to put it in evidence;

3.—Because this calculus was diagnosed as being in the cæcum of the mare, the operation confirming this; and that explains how a calculus of such exaggerated proportions had remained a long time without interrupting circulation of the alimentary mass, and only causing intermittent attacks of colic.

By relating our own experiences and by submitting to critical analysis and examination the results of the observations of others, we hope to bring a serviceable contribution to the “clinical chapter” on intestinal stones in general, and particularly as regards operating on such cases as solipeds.

If the idea of operating for the removal of intestinal calculi be old, it has not, however, been frequently employed; so much so that many writers, with the exception of a few surgeons, all refer to such operations theoretically as a rare possibility; among these exceptions are the Italians, Vachetti, Lanzillotti, and Baldoni.

In some treatises (Friedberger and Fröhner), for instance, we read that “recourse *may* be had to laparotomy in desperate cases”; in others, while its possibility is admitted, nobody advises its adoption. In a recently issued manual (Chiari) it is distinctly stated that “laparo-enterotomy for intestinal calculi in the horse is nearly hopeless”; “although advisable as a last resource, it is an operation of doubtful success” (Moretti). It is, moreover, stated by Drouin that the opening of the abdomen in equine colic has so far given few results of importance (1903). Now, if all this, as is certainly the case, has been written and produced on the basis of mortality statistics in grave abdominal operations on the horse, and especially with regard to laparo-enterotomy, our own case acquires all the greater importance, as it finished with rapid and complete recovery. It sometimes happens that veterinarians propose to perform this sanguinary operation, but the owner of the patient refuses, and we at once recall that Felizet père (*Revue Veterinaire* 1877) operated boldly on a five-year-old horse with a calculus in the floating colon at a time when such operations were performed under vastly less propitious conditions than would now be the case. We insist on the name of Felizet being honoured as that of the pioneer; also because in the more recent observations of Rickards, Dollar, and Rogers (1894), Liepke asserts that these writers were, in his opinion, the first to operate as surgeons in similar cases. But in truth it is only after the success of Felizet that one hears of the attempts of

Rickards, Dollar, and Rogers, who performed laparo-enterotomy on a mare eleven years old, from whose colon they removed a calculus weighing 2 lb. However, the patient died from fibrous peritonitis twenty-seven hours after the operation. It would seem that in spite of every precaution, the horse operated upon by Hall died in a few days. On the other hand, in the only recorded operation of Rogerson, who opened the left flank of a horse, and ascertained the presence of a large calculus in the pelvic area, the patient died under the knife. A similar case reported by Röder died eight days after the operation. After the enthusiastic declarations of Bourgelot (1897), after the praiseworthy efforts of Macqueen, of the London College, we come to the



FIG. 1.—SHOWING ABNORMAL "BULGING" OF THE ABDOMINAL WALL DUE TO THE CALCULUS IN THE CÆCUM.

suggestion of L. Hoffmann (1904), a "new method" which he calls the "A," "for the removal of intestinal calculus in the horse."

Bearing in mind the possibility of manual removal, and remembering (as seen by us at Turin) that strong peristalsis may eject the stone spontaneously, L. Hoffmann proposes for certain cases simple laparotomy without enterotomy. In other terms, he advises the veterinarian to make an incision in the flank of 12 to 15 c.m., to put his sterilised hand into the peritoneal cavity, to thoroughly search that part of the intestinal track which usually contains the calculus, which must be grasped and pushed gradually towards the anus until it is eliminated. But, excepting some attempts by Hobday, of which we shall speak later, this "new" method has been by no means well received. And if Jobelot (1904), among others, in a case of obstruction by a calculus which formed round a molar tooth swallowed three years before, could by rectal exploration seize and break this calculus, and afterwards extract it from the anus and cure the patient, we must recognise that only the most successful and rarest cases have been

reported. We now come to the operations of Marek (1905), who, ascertaining the cause by rectal exploration, removed a calculus from the colon of a horse by laparo-enterotomy. The operation lasted two hours, and the patient died the same day. Of no small value is the contribution of Hobday (1905), who, perhaps the only one, published statistics of nearly 500 cases of abdominal surgery in domestic animals. Among these are included half-a-dozen cases of laparotomy for intestinal calculus in solipeds; one of those recorded was performed by Hobday and Lowe. In two of the cases, both mares, Hobday, before cutting into the flank, made an aperture in the wall of the vagina, in order to push the calculus towards the anus. Let us, however, analyse rather closely the cases recorded by this author.

The first case reported in the *Journal of Comparative Pathology*



FIG. 2.—SHOWING MORE DISTINCTLY THE DEFORMITY IN THE AREA OCCUPIED BY THE CALCULUS.

and *Therapeutics*, 1897, operated on by Hobday, together with J. Bell and Browning, treats of a mare nine years old, and a simple laparotomy was made in order to remove the calculus, without, however, succeeding in pushing it towards the anus. The owner soon had the creature destroyed, as it suffered greatly. At the post-mortem a stone was found weighing 6 lb. In the second case laparotomy was effected, but Hobday was unable to relieve the gripping pain at the seat of the calculus by bringing it to the side of the abdominal wall in order to proceed with the enterotomy. On the same day this animal died from gangrene of the intestine—the calculus found on post-mortem weighed 6 lb. 6 oz. The third case was that of a pony six years old, diagnosis made certain by rectal exploration. Laparotomy was performed, though the calculus could not be brought to the incision, and Hobday mercifully preferred to allow the animal to die under chloroform; the stone found on post-mortem weighed

4 lb. (1906). The fourth case was a mare eight or nine years old, in whose large colon Hobday was able to diagnose a calculus. An incision was then made in the wall of the vagina, through which the hand and arm were extended and the calculus pushed towards the



FIG. 3.—PHOTOGRAPH FIFTEEN DAYS AFTER OPERATION.

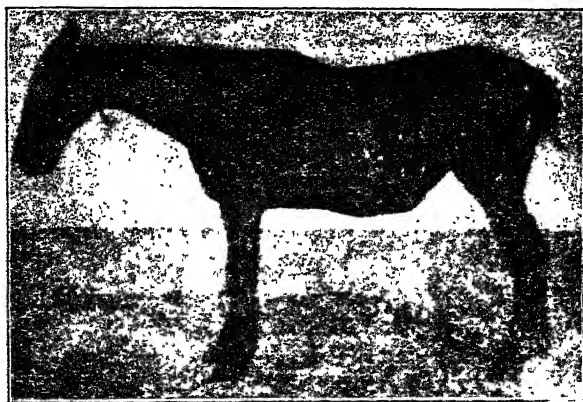


FIG. 4.—PHOTOGRAPH TWENTY DAYS AFTER OPERATION, COMPLETELY RECOVERED.

anus, but every attempt was futile. Hobday now sought the aid of a new incision, this time in the flank, which also failed, and the mare died under chloroform. The stone found on post-mortem weighed 2 lb. 14 oz. The next case was an old horse, also operated upon in the flank. The calculus was situated in the small colon, and by

careful manipulation of the intestinal walls, was worked into the large colon, where, as it was not very bulky, it caused no obstruction. This horse died on the fifteenth day of diffuse pulmonary gangrene. The sixth case published by Hobday and Lowe was a mare about nineteen years old, with a calculus in the pelvic curvature of the colon. The attempt to displace the calculus through a breach made in the wall of the vagina failed. The animal was destroyed after another trial of simple laparotomy, which only resulted in lightly displacing the calculus, which was found on post-mortem to weigh 6 lb. 6 ozs.

As the last of the series, let us record that of Lewis (1906), who practised laparo-enterotomy on a horse affected with intestinal cal-



FIG 5.—THE CALCULUS, AFTER REMOVAL.

culus. The opening was made on the right flank, the operation lasting 95 minutes. Here also the patient died after four-and-a-half days. At the post-mortem seven large calculi and sixty small ones were found in the colon.

These being recorded, we think it best, before making observations thereon, to describe the case studied and operated on at our own surgical clinic. A bay mare of native breed, fifteen years old, the property of Signor Antonio Viquery, of Brusson (Aosta), admitted to the clinic the 5th January, 1912. It is a singular fact that this animal was brought because she was lame on the off hind. As the exact position of the cause of lameness was difficult to locate, and was

accompanied by characteristic functional disturbance, we decided to make a very searching examination. When examining the mare, we did not fail to notice the existence of a deformity of the inferior wall of the abdomen in the retro-sternal zone, just in the region corresponding to that of the xiphoid cartilage—this induced us to make an examination by direct palpation. The musculo-cutaneous surface was unaffected, though pendulous at the point indicated, in which we buried our hand, exercising pressure from below upwards. We were greatly surprised to discover in the abdominal cavity the presence of a very heavy body, voluminous, slightly movable, apparently on the xiphoid cartilage, and immediately behind it. The plate (Fig. 1) will show the extent to which this object was noticeable. We made more rectal explorations, combined with palpation, but the results per rectum were always negative, it being impossible to reach the antero-inferior tract of the abdominal cavity. At that time, the clinic was not provided with a radiographic cabinet, but, in truth, as we excluded the hypothesis of tumour, it quickly flashed into our mind that we were confronted with a case of intestinal calculus, either in the diaphragmatic region of the colon or the anterior part of the cæcum. The owner was duly informed, and was requested to furnish us with any information he could give as to the habits and general health of the mare. The question of the lameness now became of minor importance, though we correctly described it as a case of muscular rheumatism affecting the quadriceps cruralis of the right side. The owner told us he remembered the mare had often been affected by abdominal pain after she had eaten her food at the end of a hard day's work, for which she had received veterinary treatment that had so far succeeded in alleviating the trouble. He was finally induced to sell her to the Veterinary School, and she was entered as a patient. Convinced that we had to deal with an enormous calculus in the cæcum, or in the diaphragmatic region of the colon, we decided to perform laparo-enterotomy when the students had just returned from vacation, and thus make use of interesting clinical material for our pupils. To proceed, we thought it best to secure the patient in a dorsal position on the operating table, as we wished to make the opening on the floor of the abdomen, close to the median line, that is, in the zone in which we had first noticed the enlargement. Our suspicions that the bowel had become adherent to the floor of the abdomen proved to be well founded. That being so, a laparotomy at the flank, or at a half-lateral surface of the abdominal walls, would have presented greater difficulties and have kept us far too long from the point where we were most interested. After every possible precaution, the operation was performed on the 10th January, 1912.

We made a wound on the lower abdominal wall immediately to the left of the *linea alba*, and extending to the free margin of the xiphoid region as far as behind the umbilical cicatrix, about 30 c.m. in length. We kept to the left because we thought we could cope more satisfactorily with a prolapsus of the small intestine than with one of the colon. The work was rendered difficult by the thickening of the peritoneal wall, and the existence of many adhesions between the peritoneum and the intestines, and by fibrous formations. After breaking down these, together with much new formation of fibrous and connective tissue, we were able to place both hands in the large xipho-umbilical incision. On exploring the abdominal cavity, we were easily made aware of calculi in the large intestine. At this point, however, we could not be precise as to the exact situation of the stone, which impressed us as being larger than a man's head, very hard, somewhat rounded in shape, and so heavy that in our awkward position we could not lift it with both hands. After a slight pause we again made the attempt with all our might to bring the bowel containing the calculus into the wound, aided by an assistant whose hand was also in the abdominal cavity, but it was all of no avail. The patient now seemed in danger of sinking, and the viscera having been exposed quite long enough, we decided to suspend the operation, and closed the wound for the time being with a triple suture. The patient did well save for an occasional slight attack of colic, and the wound healed by primary union. We made a second trial on the 22nd March, 1912, about two months after the first attempt. This time we fixed the mare on her right side, the fore limbs stretched well in front, and the hinder parts pulled backwards. We made a laparotomy incision as before, but a little above that of the first operation, and about 50 c.m. in length. The adhesions on the abdominal wall were gradually overcome, the seat of the calculus being only a little lower, and the latter was slightly movable. We were now convinced that the calculus was situated in the anterior portion of the cæcum, which had been carried forward of its true position by the weight. The lengthy incision was necessary to allow the hand of an assistant to help in working the obstruction through the abdominal breach. Many efforts were made, always very gentle, and careful watch kept to prevent prolapsus of the viscera. Finally the obstacle was brought outside through the mesentery. Every aseptic and antiseptic precaution was taken by means of bandages, gauze, compresses, etc., and the wound sutured as before. All of us were amazed at the enormous size of the calculus, which weighed 7 kilos., 845 grammes. The patient had hardly any surgical fever, afterwards being fed for the first four days only on milk. After ten days we cut away nearly all

the suture ends, and the wound healed perfectly by the twenty-second day. We kept the mare under observation for three months, during which time she had no constitutional disturbance.

The calculus was of globular form, with a smooth surface of a dark grey colour, with a marbled appearance. The dimensions were :

Maximum circumference	..	..	66.5	c.m.
Minimum circumference	..	..	64	„
Large diameter	..	..	22	„
Small diameter..	..	..	18.5	„
Specific gravity	..	..	1.6265	

On sawing through the calculus, we found in the middle a small stone the size of a pea. Around this foreign body we counted 260 strata symmetrically arranged ; there were others, but these were too fine to note. By the way, we remember that Bartherotte (1899) counted 84 strata round a central point.

The calculus when dry, and after losing its cortical stratum, was reduced in weight to 7 kilos. 645 grammes. We need not wonder at this, as Roger (among others), in “ *Récueil de Méd. Vet.*,” 1880, when weighing a calculus which had dried, records a loss of 240 grammes.

From Professor Dr. Ivanhoe Ceruti, experimental chemist at Turin, we obtained an analytical report as follows :

Moisture..	..	..	..	13.520	per cent.
Ammonia magnesium phosphate	..	..	..	65.442	„
Phosphate of lime	..	..	..	0.942	„
Carbonate of magnesia	..	..	..	2.122	„
Aluminium and iron	..	..	..	0.420	„
Sulphuric anhydride	..	..	..	0.420	„
Silica	..	..	..	0.320	„
Organic substance soluble in ether	..	..	..	0.142	„
Organic substance soluble in alcohol..	..	..	..	0.332	„
Organic substances insoluble	..	..	..	16.010	„
				99.700	„

No trace of urates nor of bone salts.

A BRIEF NOTE ON THE ADVANCE BASE VETERINARY
HOSPITAL, BAGHDAD.*

By E. BRAYLEY REYNOLDS

(late Major, R.A.V.C. and Officer Commanding.)

To those who have experience of the Veterinary Hospitals in France, the marked sunshine in the accompanying photographs may excite a feeling akin to envy when they recall the conditions of rain and mud that had at times to be endured in "La Belle France." Rain and mud, however, were by no means absent from Mesopotamia.

The hospital was situated among the mud-walled gardens on the right bank of the Tigris, about three miles below Baghdad. The already existing walls, although utilised as far as possible, had to be supplemented by many others. These walls and the mangers were built of *matti*, which consists of the ordinary earth mixed with a small quantity of *bhoosa* (short straw), moistened with water, and the mixture trampled into a thick pasty mass. This material is built up in layers of about one foot thick, which are allowed partially to dry before another layer is added. If this precaution is not observed collapse of whatever structure is being built is likely to take place. The majority of Indian followers are experts in *matti*. With mud and sunshine they can work wonders, and appear to derive a considerable amount of satisfaction from this class of work.

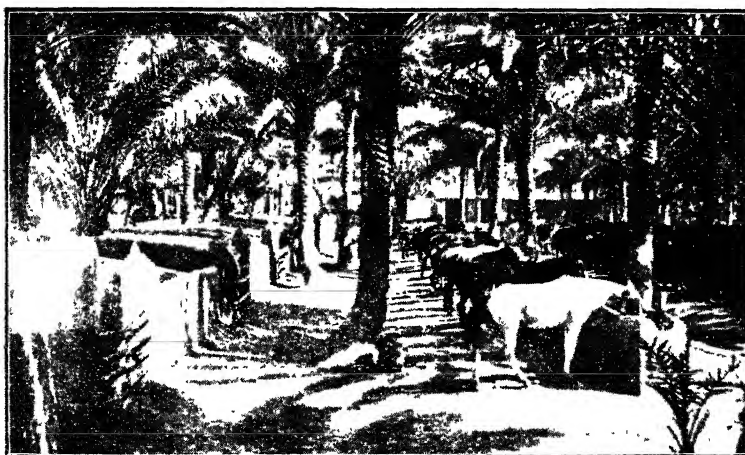
The bases of the date palm trees were also coated with *matti*, the object being to lessen the chance of injury to animals coming in contact with them, the surfaces of the trunks being very rough owing to the bases of the leaves, which are cut off, becoming dried and cracked.

The hospital contained four main wards and three minor wards, more or less detached, the Reception, Biliary Fever and Isolation Wards. The Mange Ward was situated about a mile distant from the hospital. Each of the main wards had a number of open horse lines and paddocks. The horse lines were open to begin with, although they were so placed that the palm trees afforded some protection from the sun. Later on shelters were erected, the roofs of which were made of *chatai*, a sort of reed matting, stretched over a framework of thin poles and covered with several inches of *matti*. This class of roof is very efficient as a protection against the sun, but it is too flat and too porous to afford much protection against rain in the winter. Each paddock had an area of somewhere about 2,000 square yards and contained tent shelters. One paddock is perhaps worth

Editorial Note.—The above description was accompanied by a large number of photographs, all of which, unfortunately, owing to the cost of reproduction, we are unable to reproduce. The notes here given were originally sent to describe these, and are not intended as an attempt at a complete detailed description of the hospital.



Tent Shelter in Paddock in Lane Lines. The Tents secured to the Date Palm Trees.



Boxes and Lines in Surgical Ward. Operating and Dressing Sheds in background.

mentioning in more detail. During the summer time a large number of animals became affected with capped elbows, caused without doubt by lying on the very hard ground and not by the heels of the fore shoes. It was a noticeable fact that almost without exception the animals so affected were suffering from some diseased condition of the fore feet, usually ringbone, or the so-called pedal osteitis. An animal suffering from any diseased condition of the feet will lie down more than a sound one. Those cases in which suppuration was occurring, a comparatively small proportion had to be treated surgically, but for all the cases some means had to be devised whereby bruising of the affected parts would be prevented or rendered less likely. Enough material for bedding was not always available, nor was it efficient. The surface of the ground of one of the smaller paddocks was broken up to a depth of four or five inches and many tons of sand from the river bed were mixed with the broken earth. The addition of the sand prevented the earth from being trodden down firm. The affected animals were turned loose in this paddock, the surgical cases after healing was well advanced, and the beneficial effects were very marked. It was not always possible to form a correct opinion of the degree of lameness or the extent of disease in the feet while the inflammatory condition in the region of the elbow was acute. When this had subsided, however, it was often found that the animal was not likely to be of further service and it was cast.

The watering arrangements were exceedingly handy. The water was pumped up from the river by an oil engine and conveyed in small channels through the various lines and every paddock. A great amount of labour and time was thus saved; only those animals tied on to lines had to be watered, and owing to the water channels traversing each ward the watering space was practically unlimited. The water channels were continued out to the back of the hospital, where the water was used for irrigating several acres of land on which were grown green crops for feeding of the animals in hospital—lucerne, maize and jowari.

All manure was swept up and carted, or carried on pack mules (blind or being worked into condition), to some open ground at the back of the hospital, where it was burnt. Some was burnt in specially built incinerators, and some spread out on the ground to dry, and later raked into rows and burnt. A certain amount was treated by the biological method.

A drainage system had to be provided in the winter time to deal with the large amount of surface water resulting from the heavy rains, otherwise the whole ground surface would have become a

quagmire, and some parts of the hospital would have been flooded. Mesopotamian mud is second to none in adhesive properties. Surface drains were dug leading into a number of large pits, in which the water collected and gradually soaked away. The condition of the roads did not become very bad provided the roads had been well made with a slight camber and kept well watered during the summer in order to prevent the formation of dust holes, and the surface water drained away quickly. A greater factor, perhaps, in preserving the roads during the bad weather was not to allow any but absolutely necessary traffic on them during the fall of rain.

A very slight fall of rain renders the ground surface greasy and slippery, so much so that riding on horseback becomes dangerous and almost impossible. Roughing with frost-nails, the ordinary horse nail sharpened into a kind of frost nail, makes riding safer for the man and more comfortable for the horse. The ordinary square-headed chilled-steel frost nail would be particularly effective.

HÆMOPHILIA IN A YEARLING HEIFER.

BY MESSRS. J. L. BARLING AND WOOFF, M.R.C.V.S.

(*Hereford.*)

A FEW evenings ago we were hurriedly summoned to attend a very valuable pure-bred Hereford heifer, one, in fact, intended for the Royal Show, stated to be bleeding from a "cut in the brisket."

Upon arrival we found the animal with a temperature of 105°, membranes blanched, extremities cold and respiration laboured.

In the box were several pools of blood, and the only point of hæmorrhage was a small papillary tumour on the under side of the brisket. From this blood was flowing continuously ; not with a rush, but in a steady stream.

With little difficulty the bleeding was stopped and the place sutured.

In spite of continued stimulants, the heifer gradually sank and was finally slaughtered about three hours later.

Cases of hæmophilia in animals have not been commonly recorded, but there is no doubt that they exist, and a similar case occurred in this district some ten years ago, the patient in that instance being a Hereford bull, with a bleeding papillary tumour in the region of the brisket. In this case the wound was only a very slight one in appearance and the hæmorrhage just a continual dribble, but all efforts failed to check it before our arrival, and the patient, apparently healthy in every other way, never seemed to rally from the loss of blood and shock.

A PECULIAR CASE OF INFLUENZA

By G. MAYALL, M.R.C.V.S.,
Bolton.

BROWN mare "Spot," about 10 years old. My attention was called to her because she gave over feeding entirely. On approaching her I noticed pronounced winking of both eyelids which was kept up spasmodically for about a minute and repeated each time one approached her head to take hold of the headstall. Pulse 65; temperature 105°; bowels constipated. Head pendent and dejected look. Prescribed ounce doses of mag. sulph. in the drinking water. The eyelids as they came together made a quite audible noise, and this marked symptom made me suspect some cerebral trouble. Mare much the same next day, but eating a little and bowels acting better. On the third day copious muco-purulent discharge from both nostrils. Medicated inhalations ordered. Appetite had returned somewhat and mare ate a little sloppy bran. Winking of the eyelids still quite marked. The mare showed the ordinary course of catarrhal influenza for 20 days, and the head was held so pendent that she had to be given food and drink in buckets placed on the floor of the loose box, not being able at any time to lift her head up to the manger. On the 20th day (March 8th) there was enormous swelling of the head and nostrils, difficulty in swallowing and breathing and eyelids tumefied. The case looked almost like one of malignant œdema of the head, and there was, in addition to the general tumefaction of the head, a pronounced cocoanut sized protuberance on the bridge of the nose. The discharge still continued from the nostrils. This was sponged away with antiseptic the mare's wind-pipe region was clipped, and for a week four drachms of Lugol's solution was injected into the trachea night and morning. Under this treatment the swelling of the head gradually declined, the breathing improved, and the mare's power to take an increased food supply returned. During the whole of the injection period, and for a week after, a drachm of pot. chlor. was given two or three times daily as an electuary.

On March 25th the mare got down in the box and we had to sling her. The cocoanut sized swelling on the nose persisted for some time after the head itself returned to normal and after all discharge from the nostrils had ceased. It was opened in three places, and a lot of bloody pus evacuated, and was syringed out with warm peroxide of hydrogen solution.

At the time of writing the mare is picking up and eating a fair quantity of long hay, crushed oats and bran.

Remarks.—The constant pendent condition of the head (the lips at times resting on the floor) seems to have been the chief contributory cause of the œdema. The relief given to the mare by the intra-

tracheal injections was very noticeable. The pendent position of the head seemed to favour a quick action of the Lugol's solution, which would be absorbed by the mucous membrane of the trachea, pharynx, larynx, and schneiderean membrane. The mare did not cough at all after the injections, and spots of the solution came down the nostrils at each injection. The flapping of the eyelids still continues, but is perhaps about only half as much accentuated as it was when the illness was commencing and at its height.

Translations and Abstracts.

THE ADMINISTRATION OF OIL OF CHENOPODIUM IN SOFT, OR SOLUBLE ELASTIC, GELATINE CAPSULES, AS COMPARED WITH OTHER MODES OF ADMINISTRATION.*

By MAURICE C. HALL, Ph.D., D.V.M., and MEYER WIGDOR, M.A.,
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Two of the very evident advantages afforded by the use of soft gelatine capsules are these: They furnish a convenient measured dose, and they supply a capsule with the advantages of the hard capsules (tastelessness), plus the advantage of saving bulk and bother, by combining the drug and the capsule, and the assurance that the capsule will not open in the mouth, pharynx or esophagus. They have proved entirely satisfactory in the administration of oil of chenopodium to experiment animals in our work here, and have been recommended by one of us (Hall, 1917) for use in treating dogs.

The soft capsule, however, has recently been criticised as a container for oil of chenopodium, in a paper by Darling, Barber and Hacker (1918). They state that 3 10-minim doses of oil of chenopodium in soft capsules at hour intervals only removed 66.4 per cent. of the hookworms from patients, as compared with the removal of 97.9 per cent. of the worms by the same oil when removed from the capsule and then administered in freshly-filled hard capsules. By way of explanation they state: "The soft capsules dissolved too slowly to permit their contents to affect the hookworms distributed in the duodenum and the upper part of the jejunum." Undoubtedly, this explanation is intended only as a plausible surmise. If the soft capsule digests or opens in the middle of the jejunum, it undoubtedly misses worms in the upper jejunum and duodenum, but there is some question as to whether it leaves the stomach unopened.

There are several ways of judging whether the soft capsule actually opens in the jejunum or in the stomach. One way is to determine the anthelmintic efficacy of chenopodium exhibited in the soft capsule and compare it with the efficacy of chenopodium exhibited in the

*From *The Journal of the Veterinary Medical Association*, Vol. ix, No. 2.

hard capsules. Another way is to administer the soft capsules to dogs and kill the dogs after various intervals. We have here data of both sorts and these data do not sustain the attitude taken by the writers quoted.

In the first place, our experimental findings are exact and definite, covering treatment, exact number of worms passed for the four or more days after the administration of the anthelmintic and up to the day of death of the animal, and the exact number of worms found post-mortem. There can be no question that the information obtained in this way is more exact than that obtained clinically and by examining the feces for parasite eggs, which method must be depended on by physicians working with human patients.

In the second place, hundreds of experiments show that the ascarid of the dog has a quite definite and dependable reaction to chenopodium, as Hall (1918) has noted, whereas hookworms in man or dogs have no such dependable reaction to any drugs, part of them yielding to one treatment and part quite commonly yielding only after two to five or more treatments. In judging, therefore, the fate of soft capsules of chenopodium, their results in the shape of ascarids removed from the dogs is a surer guide than that in the shape of hookworms removed from man and subsequent fecal examinations for eggs.

Finally, we have made a number of tests in the way of killing dogs at an interval after administering chenopodium in soft capsules and in other ways, and these tests show that the soft capsule does not wait until it reaches some point in the intestine before opening, but opens in the stomach. In this respect, our findings agree with the fact that our critical tests show that soft capsules of chenopodium display as high anthelmintic efficacy against ascarids as do doses of the drug in hard capsules or in castor oil. We have data on 220 dogs that have been given oil of chenopodium or its derivatives, alone or in combination with other anthelmintics, in castor oil, hard or soft capsules, or undiluted and without capsule, with records of all worms passed and worms present post mortem, and these experiments all testify to the ascaricidal efficacy of chenopodium and bear out the statement that it is as effective when given in the soft capsule as when given in the hard capsule or any other way.

In this series of 220 dogs, there are only eight that were given chenopodium in soft capsule, followed immediately with castor oil and not complicated by other considerations (enteric coats, other drugs, repeated doses involving more than one day, etc.) and these eight dogs may be compared with the animals treated by Hall and Foster (1918). These writers gave chenopodium at the rate of 0.3 m.p.k. (mil per kilo) in castor oil to eight dogs and removed 160 ascarids out of 162, an efficacy of about 99 per cent.; they gave

chenopodium in hard capsules at the rate of 0.2 m.p.k. with oilice oil and castor oil on three successive days to eight dogs and removed 15 out of 17 ascarids, an efficacy of 88 per cent. In our eight experiment dogs, all of which were infested with ascarids, four dogs received the therapeutic dose of 0.1 m.p.k., one received a lethal dose of 1.0 m.p.k. with castor oil for protection, and three received doses between 0.1 and 0.2 m.p.k., all in soft capsules. These dogs passed 87 out of 87 ascarids, an efficacy of 100 per cent. In spite of the larger doses used by Hall and Foster, the efficacy secured by larger doses with their mode of administration is slightly inferior to that secured with smaller doses in soft capsules. They report that the dogs in the first series noted above had about one-fourth of their hookworms removed, and in the second series the treatment was ineffective for hookworm. In our series of dogs, seven had hookworm; the treatment with soft capsules removed 23 out of 31, an efficacy of 74 per cent. In a series of four dogs treated by us with single doses of chenopodium, not in soft capsules, at the rate of 0.1 m.p.k. the treatment removed ten of ten ascarids, and none of 16 hookworms from two dogs; at a higher rate it removed five of five ascarids from two dogs.

So far as anthelmintic efficacy is concerned, accurate critical tests on both ascarids, a dependable form for test, and hookworms, a less dependable form, show that if there is any choice between the administration of oil of chenopodium in soft capsules or hard capsules or in castor oil or olive oil, the choice would lie with the soft capsules.

As regards the time and place of opening of the soft capsule in the digestive tract, a series of experiments was performed to furnish information on this point. The first set of tests were with the soft capsules; the second set were with chenopodium administered in oil.

The first set of tests using the soft capsules may be summarized as follows :

<i>Without purgative.</i>					
Dog No.	Capsules.	Dog killed.	Result, capsules.	Digestive tract.	Remarks.
251	3 5-minim	26 min.	In stomach ; unopened.	Normal.	Food in stomach.
252	2 5-minim	42 min.	In stomach ; unopened.	Normal.	Food in stomach.
253	3 5-minim	1 hr., 2 m.	In stomach ; 1 opened, 1 cracked, 1 softened.	Normal.	Food in stomach.
254	3 5-minim	1 hr., 21 m.	In stomach ; unopened.	Normal.	
354	3 5-minim	1 hr., 30 m.	Digested , chen. odour in stomach and small int.	Petechiæ in stomach and small int.	
348	3 5-minim	2 hrs.	Digested ; chen. odour in stomach.	Normal.	Food in stomach.
331	3 5-minim	2 hrs., 46 m.	Digested.	Gas. int. hem.	

With purgative.

(These dogs all received 3 5-minim capsules and the purgative shown.)

Dog. No.	Purgative.	Dog killed.	Result, capsules.	Digestive tract.	Remarks.
328	Ol. ric. 30 mils.	30 min.	Digested ; chen. odour and ol. ric. near ileo-cecal valve.	Mild hyperemia.	
355	Cascarin 2 grs.	30 mins.	In stomach ; open and half digested.	Gast. int. petechiæ.	
329	Ol. ric. 30 mils.	1 hr.	Digested ; chen. and ol. ric. in stomach.	Normal.	
349	Calomel 2	1 hr.	Digested ; chen. odour in stomach.	Inflam. and hem.	Dog vomited fragments of capsule.
330	Ol. ric 30 min.	2 hrs., 4 min.	Digested ; oil in large int.	Normal.	1 asc. pres. in large int.

It will be noted from an examination of the above tables, that when the soft capsules were given *without purgatives*, they were recovered from the stomach unopened as late as 1 hour and 21 minutes after administration ; they were found opened in the stomach as early as 1 hour and 2 minutes after administration ; and they were entirely digested at intervals of 1 hour and 30 minutes to 2 hours and 46 minutes. It appears, then, that soft capsules given without purgation will open in the stomach, and probably open from one to two hours after administration. This coincides with the time of onset of symptoms of salivation and vomiting in animals given chenopodium in soft capsules, where these symptoms appear. Chenopodium could be found in the small intestine as early as 1 hour and 30 minutes after administration.

Where the soft capsules were given *with purgatives*, the time of opening in the stomach was materially shortened. As early as a half-hour after administration, and after all longer periods, the capsules were partly or entirely digested, and chenopodium was detected near the ileocecal valve in 30 minutes in one instance.

It will be noted that in no cases were capsules found unopened in the intestine. When they were found at all, they were in the stomach : here they were found unopened, open, and partly digested : here the oil of chenopodium could be detected in almost all cases, as late as an hour after administration in the case of capsules given with purgatives, and as late as two hours after administration in the case of capsules given without purgatives.

Not only does all the evidence point to the opening of the capsule in the stomach, but other considerations sustain this idea. The soft

gelatine capsule becomes very much softened by exposure to the moisture of the digestive fluids of the stomach, not to mention the digesting action of these fluids. Such softened capsules break very easily on pressure, and it seems likely that the pressure applied at the pylorus would break these capsules if they started to pass unopened. Possibly the early opening of capsules given with purgatives is due to increased gastric peristalsis and prompt rupture of the softened capsule, with digestion of the capsule hastened as a result. It is also possible that the purgative stimulates secretion of the digestive fluids.

Following up the foregoing experiments, some tests were made to ascertain the fate of oil of chenopodium given without capsule of any sort, with and without purgatives. To aid in following the course of the chenopodium, it was mixed with Eaton's fat-soluble blue. The doses were at the rate of 0.1 m.p.k.

Without purgative.

Dog No.	Dog killed.	Oil found.	Digestive tract.	Remarks.
318	47 min.	In stomach.	Normal.	
321	1 hr., 4 m.	In stomach and small intestine.	Petechiæ in pyloric stomach; pylorus and duodenum hyperemic.	
319	1 hr., 45 m.	In stomach.	Normal.	

With purgation.

320	32 min.	In stomach.	Normal.	30 mils ol. ric.
322	1 hr., 4 m.	In stomach.	Normal.	30 mils ol. ric.
351	1 hr., 30 m.	In stomach.	Gast. hem., small int. hyperemic.	2 grs. cascarn, 1 asc. in int., apparently dead.
357	2 hrs.	In stomach.	Normal.	2 grs. cascarn.
352	2 hrs., 7 m.	In stomach.	Few hem. in int.	2 grs. calomel, 2 asc. in int., apparently dead. Fed before dosing. Vomited in hour after dosing.
323. This dog was given the chenopodium with oil-soluble blue and 30 mils of castor oil, and 29½ hours later the dose was repeated, this time with oil-soluble orange instead of blue. The dog was killed 2 hours and 12 minutes later. The orange-coloured chenopodium was found in the ileum; there was no trace of the blue-coloured chenopodium given the previous day. The ileum was mildly hyperemic.				

In view of the fact that small amounts of oil, such as would slowly pass the pylorus, cannot readily be detected even when the fat-soluble colouring matter is used, one cannot affirm much as to where chenopodium was not present; one can only make affirmation as to where it was present. From the experiments tabulated above, we find that chenopodium given without purgatives or the use of capsules may

still be present in the stomach 1 hour and 45 minutes after administration; when given with purgatives, without the use of capsules, it may still be present in the stomach 2 hours and 7 minutes later. We also find that even without purgatives, the oil may be in the small intestine in 1 hour and 4 minutes, and with purgation it may be in the ileum 2 hours and 12 minutes after administration, and the evidence of an apparently dead ascarid indicates that it may be there in an hour and a half. Doubtless it is in the small intestine earlier, as the experiments with capsules show.

The fact that the chenopodium in soft capsules, given with castor oil, may rapidly get to the small intestine, is perhaps due to the fact that the castor oil can exert its action at the start, unimpaired by the constipating chenopodium in initiating peristalsis.

The slowness with which the oil leaves the stomach confirms the position taken by Hall (1918) to the effect that anthelmintics, at least some anthelmintics, probably do not need to be allowed "time to act" on the worms before purgatives are administered. In this connection, Hall states:

"It is so generally believed and stated that anthelmintics should be allowed time to take effect before any purgation is attempted, that it seems almost unsafe to dispute the proposition. Dock and Bass even explain the failure of remedies to act effectively as possibly due to 'the rapid carrying down of the thymol by peristalsis to below the location of the worms,' even in the absence of purgation. My own experiences have led me to fear more the absorption of the drug in the stomach before reaching the site of the worms. In over two years' experiment work, involving the treatment and post mortem examination of over 250 dogs, the results seem to be a little better, if anything, where the anthelmintic and the purgative are administered simultaneously than where the anthelmintic is allowed to precede the purgative by an hour or longer. Such combinations as oil of chenopodium and castor oil, chloroform and castor oil, santonin and calomel, etc., seem to be as effective as the ingredients of the combinations administered separately and at intervals. It is well known, of course, that such anthelmintics as areca nut are themselves purgative. Even if it were true that anthelmintics are more effective if purgation is postponed, and it can be shown that the patient is safer where the purgation is given with the anthelmintic, would it not be good practice to repeat a safe treatment oftener, rather than to give a less safe treatment fewer times?"

We are unable to reconcile the differences in the results obtained by Darling, Barber, and Hacker and those obtained by us, as regards the value of the soft gelatine capsule of chenopodium, but we have

no adverse comment to make on their results. We merely state our own results and indicate that there is a disagreement. There might have been some differences in the capsules used by them and the capsules used by us, and it might be that the capsules harden with age, though we have no evidence of our own on this point. The soft capsule can be hardened with formalin to the point where it will not digest, and there are other substances which will have the same effect.

Our findings further disagree with theirs on a number of other points which can only be mentioned here. For one thing, they found oil of chenopodium given in liquid petrolatum 88.7 per cent. effective, while soft capsules were only 66.4 per cent. effective, whereas we find that the use of liquid petrolatum cuts the anthelmintic efficacy, even against ascarids, to zero at times, while the soft capsules have an ascaricidal efficacy very close to 100 per cent. Experiments covering this point have been published by Hall (1918) in a study by Hall and Hamilton (1918). Darling, Barber and Hacker state that "*Chenopodium* is relatively just as efficacious in removing *Ascaris*, *Clonorchis* and *Tænia*" as in removing hookworms. So far as the dog is concerned, hundreds of critical experiments show that chenopodium is unequalled for use against ascarids, and is a very inferior and undependable anthelmintic for use against *Tænia* and *Dipylidium*, removing them but rarely and showing no such efficacy as is shown by male fern or kamala. They prefer magnesium sulphate to castor oil as a purgative with chenopodium. This is a moot point which we will discuss in another paper.

CONCLUSIONS.

On the basis of many experiments with dogs, we feel safe in saying that the following is true of dogs and that these findings apply in part to man :

1. The soft, or soluble elastic capsules of chenopodium open in the stomach and not in the small intestine.
2. The foregoing statement is sustained by the high ascaricidal efficacy of the soft capsules of chenopodium, as well as by their efficacy against hookworms.
3. The administration of purgatives at the same time as the soft capsules, hastens the opening of the capsules. Without the purgatives, capsules lie in the stomach as long as 1 hour and 21 minutes, and apparently digest in one to two hours. With the purgatives, capsules are wholly or partly digested in thirty minutes. Without purgatives, chenopodium from the capsules may be detected in the intestines in 1 hour and 30 minutes. With purgatives, chenopodium may be detected in the intestines in thirty minutes.
4. The more rapid opening of capsules given with a purgative

is probably due to the mechanical action of heightened peristalsis on the softened moist capsule and to increased secretion of digestive fluids as a result of stimulation by the purgative.

5. Given in soft capsules, chenopodium may stay in the stomach as long as 1 hour and 45 minutes if given without purgatives, or 2 hours and 7 minutes if given with purgatives; or may be detected in the small intestine in 1 hour and 4 minutes if given without purgatives, and in 1 hour and 30 minutes if given with purgatives. It is probably present in the small intestine earlier.

BIBLIOGRAPHY.

- DARLING, SAMUEL T.; M. A. BARBER; and H. P. HACKER. 1918. *The Treatment of Hookworm Infection*. J. Am. M. Assn., v. 70, Feb. 23, pp. 499-507.
- HALL, MAURICE C. 1917. *Anthelmintic Treatment for Nematode Infestations in Dogs*. J. Am. Vet. M. Assn., v. 5 (3), pp. 342-345.
1918. *A Discussion of Some Principles of Anthelmintic Medication*. N. Orleans M. and Surg. J., v. 70 (8), Feb., pp. 637-653.
1918. *The Anthelmintic Value of Chenopodium Composites*. In Hall and Hamilton, q.v., pp. 240-261.
- HALL, MAURICE C., and WINTHROP D. FOSTER. 1918. *Efficacy of Some Anthelmintics*. J. Agric. Research, v. 12 (7), Feb. 18, pp. 397-447, 1 fig.
- HALL, MAURICE C., and HERBERT C. HAMILTON, 1918. *Investigations on the Composition of Oil of Chenopodium and the Anthelmintic Value of Some of its Components*. J. Pharm. and Exp. Therap., v. 11 (3), April, pp. 231-261.

COCCIDIOSIS IN CATTLE

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Symptoms.—The first symptom noted is the appearance of blood in the feces, as a bloody diarrhoea, in the form of dark brown clots, or bright red streaks. In the early stages the blood is always on the outside of the feces, but later on it may be mixed throughout the fecal mass. The animals are dull, show a disinclination to move about, lie down a great deal, eat little or nothing, and emaciate very rapidly. The skin becomes tight, the hair coat rough, and the tail and buttocks are stained with feces. The pulse and temperature may be slightly increased. The abdomen gradually assumes a tucked up appearance, peristalsis is much diminished, the feces are scanty and are passed with a great deal of straining as the disease progresses.

Course.—Hutyra and Marek state that the period of incubation is three or four weeks. After the symptoms develop the disease runs a course of from two to seven days. In the acute form death evidently occurs during the second or third day. In those animals that recover the appetite returns on the fifth or seventh day and at first is depraved. This may be preceded by great thirst.

Diagnosis.—The diagnosis is made from the history and symptoms, but can only be positively established by microscopical examination and finding the coccidia either in the feces, in scrapings from the mucous membrane, or in sections of the intestine. However, the passage of blood in the feces with tenesmus, lack of appetite, cessation of rumination, and rapid emaciation with absence of history of feeding causes, are suggestive.

Treatment and Prophylaxis.—Since coccidia are known to be very resistant to heat, cold, and ordinary disinfectants, and as the life history of the parasites is still obscure, the treatment is largely symptomatic and prophylactic measures only can be instituted against the probable sources of infection. As coccidia gain entrance through the food and water, care must be taken that the water supply is fresh and pure, and that forage is clean and plentiful in the pasture, and well cured if in the barn. The line of treatment employed in these herds was a laxative, an intestinal disinfectant, an astringent enema, and a tonic. The laxative and the disinfectant were combined as follows :—

Liquid petrolatum (Natol, Parke-Davis)	10 ounces
Formalin	1 ounce

Each animal received from six to eight ounces of this mixture, the theory being to keep down the multiplication of intestinal bacteria, which become pathogenic as soon as the epithelium has been destroyed by coccidia, and also to hasten the elimination of coccidia and debris. As an enema, about three quarts of a warm, 1 per cent. alum solution were administered twice a day through a small rubber tube. The tonic used was a 1 per cent. aqueous solution of strychnine sulphate, given in half-ounce doses three times a day. In case No. 3 secondary tympany was noted after three days and it was necessary to trocharise the rumen on two succeeding days. At each time of trocharisation, an ounce of a synthetic chlorine disinfectant, "Fecto," was injected into the rumen through the canula of the trocar. After the second trocharisation the tympany disappeared and the heifer made an uneventful recovery. The only prophylactic measures followed were a change of food and water, and the administration of a dose of formalin in oil to all animals under four years of age on both premises.

The efficacy of treatment has not been sufficiently tried out to warrant conclusions, but of the seven animals treated, only one died, and this one was considered beyond help when first seen. It is believed that if treatment is begun as soon as symptoms appear, it will prove very effective.—*The Cornell Veterinarian.*

BACTERIUM ABORTUS INFECTION OF BULLS.

[PRELIMINARY REPORT.]

By J. M. BUCK, G. T. CREECH, AND H. H. LADSON,

Pathological Division, Bureau of Animal Industry, United States Department of Agriculture.

NUMEROUS investigators have called attention to the fact that *Bacterium abortus* agglutinins and complement-fixing bodies can frequently be demonstrated in the blood serum of bulls from abortion-infected herds. Such animals in consequence have frequently been referred to as being systemically infected. While the presence of these bodies constitutes strong evidence that abortion infection exists, or has been present, success has been reported in associating positive reactions with the causative infection in so few instances as to have resulted in a certain amount of speculation regarding the significance of these reactions in male animals.

Literature, it is true, records no great amount of investigative work in connection with bulls suspected of being infected with abortion disease where the object has been the isolation of the causative micro-organism from the organs or tissues of the animals or the demonstration of lesions associated therewith.

Schroeder and Cotton,* in investigating this problem, describe two cases that came under their observation. They state that one of the bulls at the time of autopsy showed the presence of an abscess involving the epididymis of one testicle from which *Bact. abortus* was isolated. The other animal was permitted to serve a cow that was considered to be free from abortion disease. Seminal fluid which was recovered from the vagina immediately following the service and injected into numerous guinea pigs produced *Bact. abortus* lesions in one of the experimental animals.

Rettger and White† describe endeavours to associate the presence of the infection with positive serum reactions in three cases which they studied. In two of the animals neither abortus infection nor pathological changes could be demonstrated. In the third they call attention to the finding of two abscesses or cysts in the region of the groin, near the point of attachment of the scrotum; but from these abscesses they were unable to isolate the abortion organism, thus failing to obtain bacteriological evidence of the infection.

In view of the positive bacteriological findings of Schroeder and Cotton the present writers were prompted to undertake further

*Schroeder, E. C., and Cotton, W. E., Some Facts About Abortion Disease. In *Journ. Agr. Research*, v. 9, no. 1, p. 9-16, 1917.

†Rettger, L. F., and White, G. C.: Infectious Abortion in Cattle. *Conn. Storrs Agr. Exp. Sta. Bul.* 93, p. 199-249, 1918. References, p. 246.

Journal of Agricultural Research, Vol. xvii, No. 5, Washington, D.C. Aug. 15, 1909. Key No. A-49.

investigations, involving a considerable number of animals, in an endeavour to ascertain with what frequency abortus infection could be demonstrated in the generative organs of bulls giving positive or suspicious reactions to the agglutination test for this disease, and to determine whether or not pathological changes are commonly associated with such infection.

EXPERIMENTAL PROCEDURE.

The procedure employed by the writers consisted in securing blood samples from the animals as they arrived at one of the abattoirs in close proximity to Washington, D.C., for slaughter. No information was available regarding the original source of the bulls or the exposure sustained. Each sample was given a number corresponding to the serial number of a tag that was attached to the animal's ear at the time of bleeding. The blood samples were then taken to the laboratory for the application of the agglutination test. At the time of slaughter, which was usually the following day, those animals giving positive or suspicious reactions were autopsied as carefully as abattoir conditions permitted, and the organs of the genital system were secured for further study. Cultural work was depended upon as a means of detecting infection, the medium employed consisting of 3 per cent. glycerin infusion agar to which approximately 5 per cent. sterile blood serum was added. To reduce the oxygen tension the inoculated tubes were subjected to incubator temperature in closed jars in the presence of fresh cultures of *Bacillus subtilis*.

During the period from December 9th, 1916, to July 7th, 1918, the agglutination test for abortion disease was applied to 325 mature bulls. Of this number 288 gave negative results to the test. The manner in which the remaining 37 reacted is of considerable interest, inasmuch as the intensity of the reactions appeared to bear some relation to the cultural results.

The manner of applying the test consisted in the making of a 1 to 10 basic dilution of the blood serum. To the four tubes utilised for each case were added 0.4, 0.2, 0.1 and 0.05 cc. of this basic dilution. The amount of test fluid added to each tube was 1 cc.

The vesiculæ seminales, vasa deferentia, testes, and epididymides were secured from the 37 bulls whose blood serum showed the presence of *Bact. abortus* agglutinins. From 15 to 20 tubes of medium were utilised for culturing the various organs from each bull. These investigations resulted in the demonstration of the presence of *Bact. abortus* infection in four animals—No. 88, 98, 136, and 409—and in the detection of marked lesions in bulls 98 and 409.

A brief description of the work performed, and the findings in these cases follow.

CONCLUSIONS.

Bact. abortus infection may involve organs of the generative apparatus of bulls, producing chronic inflammatory changes.

Of the generative organs, the seminal vesicles appear to furnish the most favourable site for the lodgement and propagation of abortion infection.

The presence of *Bact. abortus* infection in bulls appears to be more strongly indicated by relatively marked than by slight reactions to the agglutination test for this disease—Reprint from *Journal of Agricultural Research*, vol. XVII, No. 5.

CERTAIN POINTS IN THE LIFE HISTORY OF *MELOPHAGUS*
OVINUS LINN, THE "SHEEP LOUSE FLY" OR
"SHEEP TICK."

By G. F. HILL F.E.S.

Proceedings Royal Society Victoria, Vol. xxxi (New Series), Pt. 1, 1918
(Abstract).

THE enforcement of the Sheep Dipping Act in Australia for the control of the louse fly has not had the effect of eradicating it. Sheep owners contend that this is explainable by the fact that the louse flies and their pupæ become dislodged from the host and remain visible in the grass, brushwood or other positions, that the pupæ then hatch into adults, and with the dislodged adults subsequently re-infect sheep.

From experiments the incubation period on the host was shown to be twenty-two to twenty-four days in winter and nineteen to twenty-one in spring.

From leaving the pupa case until becoming mature thirteen days was occupied, but attempts to determine the length of the life of the female were not satisfactory, and accordingly it was not possible to obtain a complete record of the number of pupa produced by one female.

Although it has been generally thought that the kidd lives only a very short time apart from its host, this was shown to be somewhat erroneous. Unfed adults under one day-old lived as long as fourteen days in winter in soil with leaves and in a tree trunk in a cellar. Under the latter conditions three to seven day-old and fed adults lived also fourteen days. Ordinary adults placed in a tree trunk in a cellar in winter all died by the eighteenth day.

The experiments to determine the visibility of the pupæ removed from the host showed that in wool in a tin at a temperature of 60–90°F.

the last day upon which young emerged from the pupa was forty-two days, and 72 per cent. of pupa cases produced young. On sand on a lawn at from 34 to 86°F. hatching took place from the twenty-second to thirty-fourth day, but the percentage of pupa bringing forth young was only 4 per cent. From his experiments and observations the author is of opinion that while a certain amount of re-infection (from dislodged "ticks" and the progeny of dislodged pupæ) is not only possible, but very probable, most of the parasites found on previously dipped sheep are the progeny of pupæ extruded prior to dipping and which have escaped the destructive action of the fluid. He experienced this difficulty in his experiments.

Even under favourable conditions the number of "ticks" which survive four or five days off the host and subsequently re-infect "tick," free sheep must be extremely small, much too small to account for a general reinfection of a clean flock or even a moderately large number of its members.

THE LIFE HISTORIES OF *HABRONEMA MUSCÆ* (CARTER),
HABRONEMA MICROSTOMA (SCHNEIDER) AND
HABRONEMA MEGASTOMA (RUDOLPHI).

By G. F. HILL, F.E.S.,
Proceedings Royal Society Victoria, Vol. xxxi (New Series), Pt. 1, 1918.
(Abstract).

AFTER discussing the work of Ransom in America, in discovering that *Habronema Muscæ* (Carter) of the house fly *Musca domestica* was an intermediate stage in the life history of a nematode which is found in the stomach of the horse, the author confirms these facts for Australia and works out the life cycle of the second two species.

It now appears that in the the case *H. megastoma* the eggs gain the cavity of the horse's stomach from the tumours produced by this species and in the voided fæces the embryos are also taken up by larvæ of *Musca domestica*. Passing through the pupa they appear in the adult fly, where they are found in the abdominal cavity. If infected flies are taken into the horse's stomach, either in food or water, the life cycle is completed. Dead or semi-dead flies are common in mangers and water troughs. Experimental evidence of the immature forms of the worm actively leaving the fly so as to infect the horse's lips or skin was not obtained.

In the case of *H. Microstoma* the life cycle was found to be identical to the above save that the intermediate host was *Stomoxys calcitrans*. Although this is a blood-sucking species, no evidence was forthcoming to show that the immature worms ever entered the horse's blood stream by way of the flies' mouth parts.

In hot countries *H. Megastoma* and *H. Microstoma* are important nematodes of the horse's stomach, where the former causes tumours and abscesses and in some cases abscesses in the spleen also. By some workers, Habronemic granulomata and Habronemic conjunctivitis, two important Australian diseases, are thought to be caused by the larvæ of *Habronema*. Although this surmise requires confirmation the finding of *H. muscæ* in Australia and experimental proof of the life histories of *H. megastoma* and *H. microstoma* is a distinct advance in veterinary helminthology. Older students will remember the last two species better as *Spiroptera megastoma* and *Spiroptera microstoma*.

ACUTE GLANDERS IN MAN.

By T. HUNTER, M.A., B.Sc., M.D. GLASG.
(Lieutenant-Colonel, I.M.S. : Civil Surgeon, Naini Tal.)

As acute glanders in man is an unusual condition and one likely to give trouble in diagnosis, at least in its earlier stages, it has been thought worth while to put this case on record. The symptoms corresponded fairly closely to those described by Goodall in his text-book on fevers. This book, however, was not available for reference till after the termination of the case, and the only descriptions of glanders in man that could be found whilst the patient was alive were records of a much less acute infection, also in an officer of the Indian Civil Veterinary Department, described by himself.* That infection lasted two years and four months, and then, after an interval of eight months, lighted up again and lasted for a second period of two years. My case was totally different from this and its history is as follows :—

A veterinary officer, aged 34 years, employed in laboratory work, was admitted to the Ramsay Hospital, Naini Tal, on June 22nd, 1919, complaining of fever, headache, pain in both legs and in the left shoulder, of six days' duration, the illness having definitely begun on the afternoon of June 17th with malaise, fever, and headache. The patient was a robust man. He had been inoculated for the enteric group in 1917. On admission the mouth temperature was 102° F. and the pulse 88 per minute, the tongue was heavily coated, and yet the patient did not look very ill. The pain complained of in the left shoulder seemed to be around rather than in the joint, but nothing abnormal could be found. On both calves there was an appearance like a small boil which had missed coming to a head; on the front of the left shin there was a red inflamed area like erythema nodosum, and on the dorsum of the left foot there was a painful area. Nothing abnormal was found in the chest or abdomen; the liver and spleen

* "Journal of Comparative Pathology and Therapeutics," vol. xxvi, p. 223, and vol. xxix, p. 26.

were not enlarged. A blood film showed distinct increase in the polymorph leucocytes. There was no sign of malaria.

The complaint of headache, the dissociation between temperature and pulse, and the appearance of the tongue suggested a tentative diagnosis of one of the typhoid group. The increase in the polymorphs was definitely opposed to this, but it was conceived as possible that there was in addition to the typhoid an infection with staphylococcus causing the boils and accounting for the blood picture. Asked on the point the patient was definite that he had not been working with staphylococcus or other pyogenic organism.

Directly on admission blood was drawn from a vein and inoculated into oxbile ; a Widal was also done. The report on these was that the blood in oxbile had remained sterile, but that the Widal gave a positive reaction to *B. typhosus* in a dilution of 1,500 and a feebly positive reaction to *B. paratyphoid A* in 1,50, and *B. paratyphoid B* in 11,100, and strongly suggested a typhoid infection. This confirmed the diagnosis arrived at clinically.

For the next week the temperature ran about 104°, generally below, occasionally above, and no new symptom developed. There was still the marked dissociation between the temperature and the pulse, the latter ranging between 80 and 100. But clinically the patient did not resemble a case of typhoid and doubts began to be felt about the diagnosis. A blood film taken on the 29th still showed marked increase of leucocytes. The boils were subsiding and the inflammation over the shin and foot was very much less. The following day the abdomen was slightly tympanitic, reviving the typhoid diagnosis.

On June 30th one or two small pustules appeared on the trunk and scalp, and the back of the right hand became inflamed. The bacteriologist took smears and made cultures from the pustules and reported them sterile. Blood was also taken and injected into broth, and again nothing could be grown.

PROBLEMS OF DIAGNOSIS.

It was now beginning to be perceived with certainty that the disease was either not typhoid or was typhoid with some other infection superimposed. In view of the profession of the patient, and as he had been employed in the manufacture of mallein, glanders was considered ; but the sterile pustules seemed to negative this, and as the pustules were in some places umbilicated for a couple of days, the suspicion of small-pox superimposed on typhoid had considerable attention. On July 2nd and 3rd very many fresh pustules appeared and large confluent pustular areas were formed, worse on the scalp. In spite of the negative bacteriological reports a definite diagnosis of acute

glanders was made on July 3rd. On the 4th it was manifest that the old inflamed area of the left shin had broken down, and there was a second area above the left knee which looked suspicious. An incision was made into each and from each a small quantity of thick gelatinous pus was evacuated. Some of this pus was examined bacteriologically and was reported to show practically pure cultures of a bacillus morphologically identical with *B. mallei*.

From this date the condition rapidly went from bad to worse. Fresh pustules continued to appear until it was hardly possible to find a piece of skin free for the area of a finger. Many coalesced and formed large pustular areas. The face was affected with the rest of the body, and the resulting swelling of nose and eyelids made the patient unrecognisable by his friends. From the evening of July 4th the patient was unconscious and breathing stertorously, though nothing was found in his chest at this stage. On the 5th abscesses were opened on the back of both hands and on the dorsum of the left foot showing the same thick gelatinous pus in very small amount. On the 6th examination showed coarse râles at the base of both lungs, doubtless hypostatic. Death occurred at 4 p.m. on this date.

Treatment was symptomatic and as for typhoid till July 1st, when intravenous injections of eusol, 100 c.cm. doses, were begun. These were given daily till the end. At first the pustules were opened, cleaned, and treated with tinct. iodine. They became so very numerous that this was discontinued on July 4th. The organism isolated from the pus was injected into a guinea-pig and produced typical orchitis of glanders as found in those animals, with an exudate into the tunica vaginalis from which bacilli like that of glanders were easily recovered.

The bacteriological investigations were conducted by Major A. Hayes, R.A.M.C., of the Naini Tal enteric dépôt laboratory.—(*The Lancet*, February 7th, 1920.)

SKIN DISEASE OF THE TAIL, A STAPHYLOCOCCIC FOLLICULITIS OF THE TAIL IN BOVINES.

BERNE THESIS BY BORCIE.

SKIN disease of the tail (tail worm) is a widespread disease; it has been previously described by Rychener under the name of *Caries vertebrarum caudæ*. It is mostly benign, but in some cases it ends fatally by septicæmia.

The coccygian vertebræ number 12 to 20 in cattle (16 to 21 according to Cornevin and Lesbre); towards the extremity they become small, thin, cylindrical; the last is most often cartilaginous, with a rounded end. The vertebral column ends three to 10 inches

from the end of the tail ; at this point the skin thickens from a sixth to a quarter of an inch ; it encloses sebaceous and sweat glands. On a square centimetre one can count 360 to 400 hair follicles and 125 to 130 sweat gland orifices. The hair follicles are implanted obliquely ; they are about one-fifth of an inch long and penetrate as far as the conjunctive tissue. The sebaceous glands form a yellow obtuse cone for which the large base situated at the surface measures about two-fifths of a millimetre. The sweat glands abound in the region of the tuft of the tail ; the secreting part measures 90 to 120 microns in thickness ; it is continued by an excretory canal 30 microns in diameter which opens into a funnel, the enlarged part measuring about 150 microns. The accidents causing the disease occur in animals of both sexes, at all ages and under the most diverse conditions of management. At first there is redness, swelling, heat and localised sensibility, most often at the extremity of the tail up to a length which varies from 16 inches to a few inches ; sometimes the extremity is free for a length of three or four inches and the inflammation situated higher up. Generally the area is hard and tense ; in other cases it is soft and very flexible. Often there is strong arterial pulsation. The ganglia may be swollen and painful.

The hair is almost always glued together and forms tufts. Very often the skin is studded with nodules and vesicles which contain drops of clear or yellow serum. One or two days later little accumulations of yellow and thick pus occur at these points. Afterwards brown crusts form which enclose a tissue of fleshy granulations. Little by little a fibrous cicatrical tissue is formed, surrounded by a reddish aureole. In some cases the lower part of the tail necroses and is cast off (dry gangrene). Histologically the lesions consist essentially of a purulent infiltration of the hair follicles. The pus contains coagulated blood ; it dilates the follicle, which may attain a millimetre in diameter. The suppuration reaches secondarily the sebaceous glands, then the skin (purulent dermatitis) where it provokes the formation of pustules and ulcerations. The conjunctive tissue does not present any trace of reaction in the immediate neighbourhood of the lesions. Bacterial examination in all cases reveals *staphylococcus pyogenus* and chiefly the variety *aureus*. The microbes penetrate into the hair follicle between the hair and sheath as far as the papillæ whose epithelium they desquamate (purulent papillitis). The microbes are derived from the fæces ; they are the normal hosts of the digestive tube.

Cure has been obtained in cases by the application of Labouraud's pomade (flowers of sulphur 1 part, chloroform 1 part, lanoline 4 parts).

Literature contains several records of serious skin disease of the

tail followed by septicæmia and ending in death. Now and then grave enzootics have been noted.

The following case gives an idea of this course. A pedigree bull of great value, aged 18 months, showed a phlegmon at the end of the tail, $5\frac{1}{2}$ inches in diameter with several deep purulent foci of infiltration.

The tuft of the tail was covered with a blackish crust. Amputation was performed at about three inches from its end. The wound granulated and suppurated; a severe œdema arose up towards the root of the tail. The temperature rose to 104°F. ; food was refused, the hind parts swayed; weakness was marked. The patient fell heavily and fractured the left horn; at the same time a fracture of the right articular apophyses of the caudal and sacral vertebræ was established. After 11 weeks the bull was slaughtered. At the autopsy:—Vertebral caries at the level of the fractures; abscess and suppuration in the medullary canal; metastatic abscess of the lung with staphylococci, streptococci and fine bacilli.

The author considers "tail worm" as analogous to sycosis of the beard in man.

G. M.

Personal.

Amongst the names of successful candidates for the degree of M.B., Ch. B. in the recent Pass list of the University of Liverpool Musical School was the name of Mrs. Mary S. Share Jones, LL.B., B.A. Dr. Share Jones is the wife of Professor Share Jones, the Director of Veterinary Education in the same University.

Captain Robert Daubney, M.R.C.V.S., has recently been sent by the Board of Agriculture and Fisheries to the United States to study parasitology in the Laboratory of the Bureau of Animal Industry, Washington.

NOTICES.

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THE LATE LIEUT.-COLONEL G. R. GRIFFITH, D.S.O.
Royal Army Veterinary Corps (Retired).

THE
VETERINARY JOURNAL

Editor :

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Sub-Editor :

GLADSTONE MAYALL, M.R.C.V.S.

MAY, 1920.

LIEUTENANT-COLONEL G. R. GRIFFITH, D.S.O.

Retired Royal Army Veterinary Corps.

THE recent death of Lieutenant-Colonel G. R. Griffith, D.S.O., removes one of the best known characters of the old Egyptian Army, whose first chief, Field-Marshal Sir Evelyn Wood, also died recently.

"Friendly," as Colonel Griffith was affectionately called by the large number of British officers who served in the Egyptian Army (the name is a reminiscence of the Friendly Arabs at Suakin), was born in 1857, and joined the Army Veterinary Department in 1880. He first went to Egypt with the cavalry in 1882, and took part in the Tel-el-Kebir campaign under Lord Wolseley, accompanying the 7th Dragoon Guards in the successful dash to Cairo immediately after that decisive battle. The surprise effected by the mounted troops was complete. The Citadel was occupied and Cairo fell without resistance. In the reorganisation of the native troops which followed, Colonel Griffith played no inconspicuous part, and he followed the fortunes and participated in the success of the new army in all its campaigns under Sir Evelyn Wood, Lord Grenfell, and finally under Lord Kitchener and Sir Reginald Wingate, in its victorious advances on Khartum and eventual reconquest and settlement of the Sudan.

A very modest, retiring man, with a great sense of humour and possessing a fund of entertaining stories, "Friendly" was a general favourite with the British and Egyptian officers and men with whom he came in contact in peace and in war. A keen observer, an active worker, a capable man, he carried out his duties in an unostentatious manner but most effectively. No great linguist, his personality was so great that he was successful when many others with better knowledge of the language were unable to obtain the whole-hearted co-operation of his subordinates that he himself never failed to inspire. He became a landmark in Egypt and the Sudan, and served his country well and truly in the adverse conditions of climate and shortage of money which beset the operations of the Egyptian Army.

A remarkable judge of a camel, he was able to detect the special points of these troublesome animals to the great advantage of the troops who had in the countries of their campaigns to depend largely on this means of transport for their supplies and also for their more mobile units. The remounts for the cavalry and artillery purchased in Syria were selected under his trained eye for many years. With the establishment of settled government in the Sudan, Colonel Griffith took charge of the very important measures which the constant outbreaks of cattle plague rendered essential. This disease constituted a special danger to Egypt, where irrigation depended to a great extent on the employment of cattle with the water wheels. The commencement of the export of cattle to Egypt for food purposes was only possible under the careful organisation instituted by Colonel Griffith. The trade has developed considerably since he left the Sudan in 1907.

In 1909 he married Miss Alice Maud Redpath, daughter of the late Rev. G. D. Redpath, of Harbledown, Canterbury, and Montreal, Canada, who survives him. His long service in trying climates affected his health and the last few years of his life he suffered considerably from his devotion to the interests of the countries in which he spent 23 years. He was much disappointed that owing to his health he was unable to take an active part as a soldier in the recent war. His work was well recognised by the late Lord Kitchener, who not only tried to obtain his services for the Transvaal War, but invited him to go to India when he himself was appointed Commander-in-Chief after South Africa.

He was awarded the 1882 Egyptian Medal with three Clasps and bronze Star with Clasp for Tokar; the Egyptian Medal with no fewer than ten Clasps, and the British Medal for the Sudan. He was three times mentioned in despatches, and for his services he

received the D.S.O. in 1896, 4th Clasp Osmanieh in 1891, and 3rd Class Medjidieh in 1898, raised to the 2nd Class in 1907. He was a Pasha of Egypt with the rank of Lewa in the Egyptian Army when he retired.

The funeral took place on Thursday, March 25th, at Hartley Wintney. Many of his old friends unable to attend sent letters of sympathy on the sad death of an old comrade in arms. Among those who were present, in addition to the immediate family and household, were Major-General L. J. Blenkinsop, C.B., D.S.O., Director General Veterinary Service, from the War Office; Major-General Butler, C.B., C.M.G., Deputy Director Veterinary Service, Aldershot; Col. E. Thornton Taylor, Lieut.-Col. Phipps, Major Dixon, Mr. Andrew Taylor (vice-chairman of the L.C.C.), Mr. Montague Scott, Mr. A. Chester Hillman, Dr. Balgarnie, and several officers of the Royal Veterinary Corps, from Aldershot. On the Union Jack covering the coffin were several beautiful wreaths from the family and servants and a few close personal friends, one being sent by "officers past and present of the Egyptian Army to a gallant comrade."

Editorials.

VETERINARY SURGEONS ACT (1881) AMENDMENT BILL.

THE Amendment Bill has now passed Standing Committee and is to be reported to the House on June 11th. We understand the Third Reading is to be taken on June 18th. There appears to be still some opposition to the Bill amongst farmers and stockowners, to judge from the remarks in our agricultural contemporaries. The erroneous assumption still exists that the Bill will prevent the employment of shepherds or other farm servants from performing small operations on animals. An inspection of the Bill ought to suffice to dispel such an hallucination, but there is in addition the considered opinion of the eminent Law Lord quoted in our last issue and of the late Dean of the Faculty of Advocates who holds that there is nothing in the Act of 1881 or in the Bill "which can be held to forbid or to penalise the employment of unqualified persons for performing operations on animals or for treating or prescribing for diseased animals."

The opposition of the unqualified and unregistered persons is still unabated. They allege that the Council seeks to eliminate unregistered practice and quote a draft Bill of 1907 in which a clause appeared to forbid practice for fee or reward by unqualified persons. But that was merely the first rough draft of a measure which never saw the

light. The first Bill introduced into Parliament contained no such proposals, and was substantially identical with the present Bill. We understand the Council of the College has agreed to withdraw the newly-worded Bye-law regarding covering and the employment of unqualified assistants, and to substitute in its place the old Bye-law which was in force from 1896 to last year.

In the interests of the public it is necessary that the Bill should be passed without any obstructive or embarrassing amendments. Members should lose no opportunity of influencing the M.P.'s for their districts to secure their support in the further passage of the Bill through Parliament. The profession must have the public recognition which its work demands. To this end the standard of veterinary education and professional ethics must be maintained as high as possible, and the governing body of the profession must be placed upon a satisfactory financial basis. The passing of the Bill will be the beginning of a new era in which at last the profession will come into its own.

THE CHOICE OF A VERMIFUGE FOR ROUND WORMS.

THE Veterinary Profession in all countries is indebted to the painstaking observations of our American Colleague, Mr. Maurice C. Hall, upon the actions and dosage of oil of chenopodium in the treatment of round worms, as in this drug we have at last found a remedy which is a specific against these pests.

It is by no means a new drug, but it is only of late years that its use has been prominently advocated, and that the most effectual methods of using it have been worked out. Although not quite non-poisonous, it can be used in reasonable doses quite fearlessly, and, compared with santonine, it has many advantages, both in regard to cost and uniformity of action. We draw our readers' attention to the abstract on another page of this issue.

EPIZOOTIC ABORTION.

KNOWLEDGE concerning the subject of Epizootic Abortion in Cattle cannot be too widely spread at the present time, for there is no doubt that, next to Tuberculosis, it is the most serious problem the dairy farmer of the present day has to face.

In addition to the regulations and bye-laws framed by the Board of Agriculture it is necessary that local County Councils shall urgently take the matter in hand and apply the regulations stringently in accordance with the local conditions, etc.

In matters of this kind, the framing, and even the carrying out, of the local bye-laws depends in a great measure upon the Veterinary Adviser, who if he is a strong man and well acquainted with his subject is "a power in the land." As an instance of this we publish in another column some remarks recently issued in pamphlet form by the County Council of Lanark. Originally written by the Veterinary Inspector, Mr. Hugh Begg, F.R.C.V.S., for the benefit of the Chairman and Members of the Executive Committee of the Local Authority, this pamphlet contains much sound, practical advice of the greatest value to farmers and dairymen, and much food for thought for every practical veterinarian. For this reason we give the pamphlet *in extenso*, and shall be glad to receive the opinions of our readers as to their experience of the methods taken within their own observation for the control and eradication of this troublesome disease.

INDIAN ARMY VETERINARY SERVICE.

THE Secretary of State for India announces the introduction of the following scale of grade pay for officers of the Army Veterinary Service in India, with effect from July 1, 1919 :—

	Rs. per mensem.
Lieutenant	550
Captain, on promotion	650
Captain, after two years' service as such	700
Major, on promotion... .. .	950
Major, after five years as such	1,050
Lieutenant-Colonel	1,300
Colonel	1,450

Staff pay as laid down in Army Regulations, India, is also admissible. Army of Occupation bonus is not admissible concurrently with these rates, but in cases where the old rates with the bonus are more favourable, they may be retained until the general abolition of the bonus or until promotion, whichever is earlier.

Children's allowance, when admissible under Indian regulations, may be drawn with the new rates of pay up to December 31, 1919. These rates, which will not carry exchange compensation allowance, are provisional, and subject to revision when permanent rates of pay are fixed for other military services in India.

The above rates of pay are an advantage over the old ones for the younger ranks and compare favourably for them with other branches of the service. Owing, however, to the fact that promotion in the Veterinary Service is not so rapid as in the Medical and other branches, the higher ranks are not so well served, and this is a matter which should be reconsidered and readjusted.

Original Communications.

HYDRO-THERAPY IN THE TREATMENT OF COLICS.

By MAJOR C. G. SAUNDERS, D.S.O., B.V.Sc., M.R.C.V.S.
(formerly Professor of Surgery and Anatomy, Ontario Veterinary College),
Worthing, Sussex.

ALTHOUGH the term Colic, from a purely scientific standpoint, is open to objection, yet from a practical point of view it has a place in pathological nomenclature, and is a very convenient word to use in connection with those diseases and conditions of the organs situated in the abdominal cavity which are associated with pain as a prominent symptom. In the present article colic is applied to the digestive tract alone, to the exclusion of renal, hepatic, vesical colic, etc, and is further confined to those conditions resulting from the imperfect digestion of the food and faulty or suspended elimination of the waste products of digestion, for it is in these conditions that hydro-therapy plays such an important part in reducing the annual death roll from colic. Hydro-therapy, as the name implies, is the treatment of disease by water, and here again indulgence, as regards strict definition, is asked for, because in practising hydro-therapy for the treatment of colics, it has been found advantageous to administer medicines, either dissolved or suspended in the water, so that to the captious critic the term hydro-therapy might be questioned. In advocating the practice of hydro-therapy no claim is made that the long sought for specific has been found, or that it should supersede the ordinary methods of treatment at present in vogue, but it is claimed that it is a most valuable, in fact, to some of us, an indispensable, addition to the means up to now adopted in the treatment of gastric tympany, gastric impaction, intestinal tympany and impactions or in any type of colic due to undigested food. As the stomach tube is the indispensable means of applying gastro-intestinal lavage or hydro-therapy, a short description of the tube itself, and the method of using it, may not be out of place. The material of which the stomach tube is made is of great importance; it must be manufactured of pure rubber, glass moulded, and with no canvass lining. Tubes lined with canvass are not sufficiently pliable and curl themselves into awkward kinks that always hinder, and sometimes altogether prevent, the insertion of the tube. Two styles of tube are in vogue, the single tube and the double or return flow tube; both have their advocates and both are useful, but after many trials it has been found that in practice the single tube will accomplish all that the double one will do, and has the distinct advantage of being both cheaper and more portable. The chief advantage of the single tube is, how-

ever, the fact that it can be easily passed into the stomach via the nasopharyngeal route, whereas the double tube can only be passed by the mouth, and this means either the use of a mouth speculum or gag, or the strapping of the jaws together to prevent injury to the tube. These two objections alone are sufficient to warrant the exclusion of the double tube, as in the first place the patient resents the passage through the mouth and the restraint of the gag, especially if the procedure is prolonged, as it often is in bad cases, and in the second it is much more difficult to introduce the tube *per orem* than it is *per nasem*. It is claimed by the supporters of the double tube that the advantages obtained by being able to keep up a continuous circulation of water through the stomach and tube by means of the pump counterbalance the other defects, but as a matter of fact the pump only plays the minor part of introducing the water, it is the intra abdominal pressure that causes the outflow, so that except in theory their arguments will not stand. The tube itself is, as above stated, made of pure rubber, about ten feet long and one inch in diameter. The lumen should be as large as possible, consistent with the rigidity of the walls which must not collapse under the oesophageal pressure. One end of the tube is smoothly bevelled, while to the other is fixed an attachment for the enema pump. About eighteen inches from the bevelled end the tube is marked with a black ring, and is similarly marked at six feet. The marks respectively indicate that the tube, when introduced, is in the vicinity of the pharynx and stomach. A stylet should be provided with the tube, as after much use the tube becomes very pliable and has a tendency to find its way into the trachea instead of the oesophagus, to the great annoyance of the operator, but luckily with little or no harm to the patient, who, contrary to expectation, only quite exceptionally coughs when such an occurrence takes place. When the stylet is used care should be taken to thoroughly lubricate it before inserting into the tube, or great difficulty will be experienced in withdrawing it. Before going on to describe the actual passing of the tubes, a brief *resumé* of the anatomy and physiology of the regions invaded will elucidate some of the prevailing mystery in regard to stomach lavage, and make the technique more intelligible; in fact, it is only a working knowledge of these that makes the passage of the tube via the nostril a possibility. The nasal chambers are divided into three meati by the turbinated bones, the anterior atria of the middle and inferior meati being only accessible from the nostrils. It is here that the first mistake in attempting to pass the tube is usually made, it being inserted into the middle meatus. If we trace the middle meatus backwards, it is found to terminate against the ethmoid and does not lead into the

pharynx, consequently the tube stops at the ethmoid, and does not pass into the pharynx as desired. On tracing the inferior meatus or floor of the nasal chamber backwards towards the pharynx, it is found to terminate in a considerable foramen which, leading directly into the pharynx, allows the tube to pass without any resistance. The superior meatus may be disregarded as there is no possibility of entering it at the nostrils. As we know, swallowing is a mixture of voluntary and involuntary action, the first being the working of the food bolus over the base of the tongue and into the pharynx; once there, voluntary control ceases and the act is completed by involuntary action. Concisely the nervous mechanism is as follows: The afferent impulses set in motion by the presence of food (in our case the end of the tube), proceed via the fifth and superior pharyngeal nerves, to the swallowing centre in the medulla, from which efferent impulses are given off to the pharyngeal muscles, larynx, and oesophagus by way of the pharyngeal plexus, glosso pharyngela, hypoglossal and recurrent laryngeal nerves. The net result of this nervous phenomena being the closure of the glottis, constriction of the larynx, and from our point of view most important than all, the advancement of the pharynx and oesophageal infundibulum, which seize the food or tube, as the case may be. Waves of peristalsis now run down the oesophagus, carrying the food or tube into the stomach. It will thus be apparent that in passing the tube force is not required, physiological processes being impressed into service, in fact, force at any stage of the operation is most strongly contra-indicated, and being not only likely to cause injury to the turbinated bones (or ethmoid, should an error be made at the start), but also to interfere with the normal physiological functions.

Technique. Position of the Patient.—This is of some importance to the easy passage of the tube and the patient's safety. The animal should be backed into a corner, and if violent, given a narcotic such as a hypodermic of morphia; this latter, however, is only occasionally necessary. The head should be well extended and in a straight line with the neck. The use of the twitch only complicates matters and should be avoided if at all possible.

Position of the Operator.—The tube can be equally well passed by either nostril, the choice of which lies with the operator. It depends largely in the ability to use either hand with equal facility. The left nostril is usually selected, and that being the case, the operator stands at the near side of the head, slightly in advance of the nose, having hung the tube around the shoulders and having the bevelled end in the left hand. To commence with, the first foot or eighteen inches of the tube should be well lubricated with linseed tea decoction

of slippery elm bark, or even with the patient's own saliva. Vaseline may be used, but it has a detrimental effect on the rubber. The remainder of the tube is lubricated as it is fed in foot by foot, otherwise if done at one time it is hard to handle and also likely to pick up bits of straw, etc. The head being steadied and extended the end of the tube is introduced into the left nostril, special care being taken to keep the end depressed by the fingers of the right hand on to the floor of the nostril and under the end of the terminated bone. Safely in the inferior meatus, the tube is then steadily pushed in until the first mark appears, which indicates that the end is in or near the pharynx. It should be noted that the tube should glide into the pharynx without the slightest opposition and that no force is necessary. The entrance of the tube into the pharynx is signalled by the patient swallowing or perhaps coughing and the tube is withdrawn about two or three inches, the left hand grasping it about four inches from the nostril. The fingers of the right hand are now lightly applied to the exterior of the pharynx and the tube advanced slowly until the commencement of a swallow is sensed by the right hand, when the tube is pushed quickly, but gently, forward. If successful, swallow succeeds swallow, and the tube is fed in until the second mark is reached, when some slight resistance is felt, which after a second or so of steady but gentle pressure is overcome, and the tube enters the stomach, which event is signalled by a gush of gas, and if the ear be applied to the end of the tube the characteristic gurgling stomach sounds can be heard. In some cases, either owing to the use of too pliable a tube, or the failure of the pharynx to grasp it, the end, instead of entering the pharynx, descends into the trachea, in which case the characteristic "tug" of the pharynx is not felt and the tube passes with absolutely no feeling of resistance; at the same time if the ear be applied to the end of the tube, blowing sounds synchronous with the respirations are heard and the expired air impinges on the face. No reliance can be placed on coughing as to whether the tube is in the trachea or pharynx; in fact, coughing is more often provoked when the tube enters the latter than when the former is invaded. A word of caution is necessary when withdrawing the tube; if pulled out quick and carelessly the end is liable to fly up as it leaves the nostril and fracture the turbinated bone, the result being a somewhat profuse if harmless hemorrhage. This is avoided by pulling the tube upwards as well as outwards and by keeping the end depressed with the fingers of the right hand until it is clear of the nostril. Hemorrhage may also be occasioned by fracture of the ethmoid by improper insertion, or by pushing the tube in too fast so that it bends upwards in the nasal chamber and fractures the tur-

binated bone; the remedy for the avoidance of this accident is obvious.

CONDITIONS IN WHICH THE USE OF THE STOMACH TUBE FOR THE APPLICATION OF HYDRO-THERAPY IS ESPECIALLY INDICATED.

Acute Gastric Tympany.—It is in this parlous condition of the horse's stomach, where denied the relief of vomition by the arrangement of the muscle fibres and mucous membrane at the cardia and with the duodenal lock preventing any egress from the pyloric opening, that rupture of the viscus is almost certain unless speedy relief can be afforded. The death roll is a good indication of the efficacy of medicinal treatment alone, and it is here that the stomach tube stands alone for efficiency.

Treatment.—Several gallons of warm water, the tube and pump are all that are really required. The tube is passed as above described, and with the gush of gas and liquid chyme relief is almost instantaneously afforded; in any case the impending rupture of the stomach is avoided. Sometimes the tube will block up with particles of food, in which case it is cleared by injecting a quart or so of warm water and the flow of the stomach contents is re-established. About two gallons of warm water are now pumped into the stomach, the pump disconnected, the end of the tube depressed and the water siphoned off; this is repeated until the water either comes away quite clear or does not come back at all; in the latter case it indicates that the duodenal lock has been overcome and the water passed on to the intestines. One or two gallons of water to which has been added some antizymotic is now pumped in and the tube withdrawn. A copious rectal injection completes the operation, the whole procedure having taken about half an hour.

Intestinal Tympany.—Stomach lavage or hydro-therapy, is always indicated in these conditions and, except in the case of great emergency where the trocar is urgently required, should proceed any attack on the bowel itself, either by way of rectal injections or the administration of medicines. If this practice is followed out, it will be found, in the great majority of cases, that further treatment is needless and much time and medicine will be saved. Again, the constant use of the stomach tube in these cases has clearly demonstrated the fact that sooner or later, during the course of an attack, the stomach becomes involved owing to antiperistalsis.

Treatment.—The stomach is first of all washed out by means of the stomach tube and pump and then from three to four gallons of warm medicated water are injected and the tube withdrawn. A copious enema or so usually starts the passage of flatus and relieves the tympany. In rare cases the treatment needs to be repeated in

two or three hours, and this is mostly found in those cases that have received hypodermics of arecoline, etc., *before* the stomach lavage. The advantage of the tube in these cases is that any medicines it is desired to exhibit, after the lavage, can be easily administered via the tube, and this especially applies to bulky drenches such as oil or irritant solutions of chloral hydrate, ammonia, etc.

Impactions of the Stomach and Intestines.—These are grouped together as the treatment is essentially the same, though varying in the time of application and the attainment of the desired results. In these cases the emptying of the stomach is a much more prolonged procedure and may require a couple or three hours persistent work, as it is only by repeated injections and siphonings that the solid gastric contents can be liquified and removed, but the results more than warrant the time and trouble expended. In the case of intestinal impactions from three to four gallons of water are introduced into the stomach twice daily, having six ounces of hyposulphite of soda dissolved in them, twelve ounces being given daily. Frequent and copious rectal enemata are given daily and peristalsis is excited by repeated small doses of strychnine given hypodermically. Drastic purgatives of any description should be avoided, but when peristalsis is established a small dose of esserine or arecoline is indicated.

Spasmodic colic does not seem to call for the use of the stomach tube, but at the same time it is a matter of experience that its use in that affection produces excellent results, and the animal not being nauseated or put on the sick list by the administration of aloes or oil is ready to go to work the next day without fear of untoward consequences. Once the knack of passing the tube is learnt and advantages of gastric lavage recognised more generally, I venture to say that hydro-therapy in the treatment of colics will play a far greater part in the future than in the past—that is, if there are going to be any horses left to treat.

OBSERVATIONS AT THE ABATTOIR.

By E. MORGAN, M.R.C.V.S., D.V.H.

Puerto Cabello.

“ The time has come, the Walrus said,
To talk of many things.
Of shoes and ships and sealing-wax,
Of cabbages and kings.”

A FEW weeks ago, whilst examining the livers of cattle slaughtered at the Abattoir of the Packing-house, Puerto Cabello, I came upon a liver which contained two gall-bladders, which was the first one I had seen or heard of containing such. Judging by the thousands I have to examine weekly at certain months of the year, I consider

the presence of these two gall-bladders quite phenomenal. The liver trimmer who has been at the same work for a great number of years, says that this is the first time he has known it to occur. This might not be news to the minority, but on the other hand it will be so to the majority.



Twin Gall Bladder found in the Liver of a Four Year Old Venezuelan Bullock at the Puerto Cabello Abattoir.

The liver itself was normal in form as well as in health. The bladders were perhaps a shade smaller than the average sized gall-bladders. Unfortunately the knife punctured one of them before

they were weighed, so I surmise that several ounces of bile escaped this way. The total weight of the two bladders and the remaining contents was exactly one pound. With the exception of a membrane of connective tissue, there was no other connection or communication whatever between the two as far as the interlobular ducts, where there was an inter-communication of the ducts. In the illustration one can observe where I cut through the connective tissue in order that the two might appear more definite in the picture. The one on the right hand side has a small protuberance about an inch long at its base, which was of the same structure as the bladder wall.

II.

Whilst examining a mob of 500 bullocks, prior to being slaughtered, a few months ago, I noticed that two beasts possessed an extra number of ribs.* One had 14 pairs, while the other had an extra rib on the left side only. The animals being semi-wild would not allow one to approach them except at several yards' distance. I mention this in order to impress on the student how distinctly plain they can sometimes be seen. On post-mortem one was able to make a close examination. These extra ribs have their distal ends free, and can be observed in the living animal behind the thirteenth pair, where the free extremity raises the skin upwards as if the animal has a fractured rib. Should the animal be a lean one, it is still more prominent, and causes, undoubtedly, a certain amount of inconvenience to the animal, should he be packed along with others in a railway waggon. They remind one of a broken steel or rib of an umbrella ready, on the least pressure, to burst through. These supernumerary ribs are only about half the length of the longest ribs, are less curved, and are not, in some respects, unlike the first pair of ribs.

"Alas for those who never sing,
But die with all their music in them."

The above does not apply to an Italian friend of mine who has more than seventy years of life, and has made his fortune in dealing with horses and Panama-hats between Peru, Equador, and Venezuela. Since the advent of the automobile to South America he has retired from the horse trade and taken a cattle ranch so that he should not be idle in his old days. The other day, while staying at the same hotel as myself, I listened to him relating some of his experiences with the noble steed to a crowd of eager live stock breeders. He suddenly paused, and then asked some members of his audience whether it had ever occurred to them that the horse was almost unique in the way of expressing or uttering its so-called language or natural voice (neighing). Human beings and most animals utter it orally, or by

*This loin rib is called "*Chuleta*" in Venezuela,

way of the mouth. Does the horse do so? was his question. Can all the veterinary students answer my Italian friend's question? Should one or two be in doubt, or the question not quite clear, their teachers will enlighten them.

INTERESTING CASE OF "BASTARD STRANGLES."

By R. BEATTIE, M.R.C.V.S.

Crieff, Perthshire.

Subject.—Bay draught Canadian gelding, brought over with a number of others, all of which were sold by auction.

History.—Bought by a client for £84 and sent to his farm, where he was isolated for 7 days and then put to work. During that week he seemed all right, and ate well.

After yoking, he was very tired at end of half day, and refused food that evening. Next day he ate fairly well, but seemed dull and was "tucked up" in the belly. He was left in, and for a week he daily looked worse, though sometimes he ate well, and at other times only "picked" at his oats and hay.

Writer was called in at end of second week's rest, and learned the above.

Symptoms.—The horse was standing in his box, looking dull and heavy, and very much "tucked up." At first glance there seemed to be a "pleuritic line" present. Pulse was steady, 45 per minute, but rather weak. Temperature normal. No history of coughing; glands normal. Respirations were rather shallow, chest revealed nothing. Teeth were normal. Closer examination of sub-maxillary region showed presence of a healed scar, like a knife wound. Visible membranes were normal.

Diagnosis.—Doubtful; suspicion of latent strangles, as the writer had seen these horses sold and had noticed one with an unhealed strangles abscess.

Treatment.—Physic ball; bran mashes, warm, comfortable box.

Powders night and morning, each containing	{	P. Gentian	5i
		P. Nux. Vom.	5i
		P. Sod. Bicarb.	5ii

The horse was seen two days later; the physic had acted moderately, but he was looking worse. Temperature normal; pulse 65 and weak, and seemed more tucked up. He moved stiffly and seemed in pain, dragging near hind leg. The anus was distorted, but no external swelling was present. Rectal examination was very painful and revealed the wall of a large abscess, bulging into the rectum. Pressure caused great pain. Hot enemata and fomentations over near quarter were now ordered, the latter followed by liniment.

Sod. hyposulph. was given in drinking water. It was thought inadvisable to use the knife just yet, due to position of abscess. Next day the abscess burst close in to side of anus on near side, and this was followed by a very marked improvement in the horse. The opening was enlarged, and treated by syringing in the ordinary way, and sod. hyposulph. internally. He improved daily for a week, but then went off feed again, and seemed worse than ever.

It was thought likely that another abscess was forming, but none could be found. The abscess already opened seemed to be doing very well; 2 c.c. streptocine were given hypodermically and he was tempted with "all manner of good things." At one meal he would eat well, and at another would touch nothing. Pulse crept up again, reaching 72, but temperature remained normal throughout.

Two days later he went down and had to be assisted to rise. He showed a great stiffness of *off* hind leg. Rectal examination on that side revealed nothing except slight pain on pressure. He was put in a float and admitted to hospital. Fomentations and liniment were applied over right quarter, but he only got more lame. An exploratory incision deep into middle gluteal muscle revealed nothing. Next day, on pressing very firmly from right kidney backwards over hip, a slight "swish" was heard once only. An incision just behind right kidney was made through skin, and this was enlarged with finger, boring down between muscle fibres. When seemingly almost down on to lumbar vertebræ, a little pus escaped. The opening was enlarged, and pus flowed freely. A long syringe nozzle inserted and directed backwards revealed a huge abscess, situated very deeply, and extending forwards to about middle of right kidney, and backwards to root of tail on right side. Three incisions were made, cutting down on to the nozzle, and at length it was irrigated out, and rubber tubing with many holes was inserted the entire length. He received two more doses streptocine at three-day intervals, and now rapidly improved. The abscess healed very quickly indeed, and the patient commenced eating well.

A liberal diet, and frequent antiseptic irrigation did the rest.

He has now been discharged a month and is in good condition, so this is probably the end of it.

HYDROCYANIC ACID AS AN ANTIDOTE TO CHLOROFORM.

By ARTHUR PAYNE, F.R.C.V.S.,

Weybridge.

THE value of Scheele's hydrocyanic acid as an antidote to overdosage of chloroform was first demonstrated by Professor Hobday in a series of observations published in the *Journal of Comparative*

Pathology and Therapeutics (Vol. xi) and the *Lancet* (January, 1898), and has since been confirmed and constantly used by veterinary surgeons in this and other countries ; but the following case, one of a number in which I have had to have recourse to its use, is especially worth recording on account of the length of time which elapsed between the cessation and recommencement of respiration.

The patient to which chloroform was being administered was an old fox-terrier with malignant disease of the testicles, and during the operation the respirations ceased. The tongue was drawn forward, ammonia applied to the nostrils and artificial respiration commenced as quickly as possible ; three minims of Scheele's hydrocyanic acid were given hypodermically. For five minutes there was no response and in desperation I poured four drops of Scheele's acid on the back of the throat, continuing the artificial respiration. Within a few seconds the animal gasped, then gave several deep inspirations and eventually recovered.

AN INTERESTING CASE OF "RED WORM" IN COLTS.

By R. BEATTIE, M.R.C.V.S.

(Crieff, Perthshire.)

Subjects.—Clydesdale filly, rising 5 ; and Clydesdale gelding, rising 4.

History.—Neither had ever been yoked, owing to poor condition and the fact that they were "surplus stock" on a hill farm where sheep were the chief thing. They had run out last summer with about 20 other young horses, on old grass which had not been cultivated for many years. They had been on the same pasture in the summer of 1918 also.

Towards October last the above subjects and one other began to get thin and seemed "bad doers." They were taken in and given a liberal feed of oats and hay, and as the third one had already been sold, she was despatched to her new owner. The two above-mentioned were well looked after, and ate well, indeed ravenously, but got thinner and thinner. About Christmas last they were each given a course of worm powders, with negative results. They got poorer in condition, and on January 24 I was asked to go and see them.

I learned the above from the owner, and on enquiry as to any other deaths among young horses, he said that at the end of November, 1918, or thereabouts, a yearling colt showed the same symptoms and gradually faded away and died. A post-mortem had been held, and it revealed "a large tumour in the stomach and was said to be tuberculosis" (the owner's words). It was not cut into, nor were any further details noted.

I visited the farm next day, and found the two above subjects. They were both good animals as regards size and bone, but in very bad condition. The filly was the better of the two, the colt being quite weak and about the stage when poverty merges into emaciation. Both had harsh, staring coats, a general itchiness of the skin, especially around mane and legs, and were most unthrifty looking. Pulse in each case was regular though weak. Temperature of filly was normal, that of colt .5° below. Visible mucous membranes were very pale and of a watery character, with a tinge of yellowness. Both had a jugular pulse, and were in a dull, listless condition. No œdematous swellings of head or sub-maxillary region were found, nor was there any history of any having been seen.

The teeth in both cases were normal. A good feed of oats was given to each and they ate it ravenously. The fæces appeared normal. No worms had been seen at any time.

Diagnosis.—Worms, and with the history of the colt the year before, a grave suspicion of "red worm." Enquiry showed that this condition was unknown in the district (the writer was a new arrival). The case of supposed tuberculosis in the colt the year before was considered unsatisfactory, and was thought to be most likely "worms" encapsuled in the wall of the stomach, either in the adult stage or in course of development (oh, for those notes I lent a fellow student and never got back !)

Prognosis.—Doubtful, especially in case of colt, and in absence of absolute positive symptoms, as presence of the worm.

Primary Treatment.—They were ordered to be housed in warm loose-box, given a liberal feed of oats and hay, with treacle, and a bran mash twice weekly. The owner was instructed to examine carefully all dung passed, to take it out to the sunlight on a shovel and to reflect the light on it and watch carefully. He was told what to look for—"little fellows gorged with blood." Progress in this direction was to be reported. If nothing was found in a day or two I was to start treatment on chance.

Next day he burst into my surgery flourishing a small tin box, containing about a dozen of my little friends, all gorged with blood.

Treatment.—A purgative was considered necessary, and calomel was selected. Each were given ʒiiss in a handful of mash at night, and both animals were walked into my loose-box next day. The calomel had very little effect indeed.

Hospital Treatment.—1st day. Each 1½ pints normal saline intravenously in the morning, and in the evening atoxyl grs. v hypodermically and thymol grs. xl. orally, as emulsion.

2nd day :—Each grs. vii atoxyl hypod., gelding 1 pint normal saline intravenously.

3rd „ Each grs. xl thymol as before.

4th „ Atoxyl grs. x hypod.

5th „ Thymol grs. xl as before.

6th „ Atoxyl grs. xv hypod.

During this time each was having daily 14 lbs. good oats, and 20 lbs. hay, with a bran mash substituted twice weekly for the night feed of oats. Treacle was given as drinks with water, and treacle water was poured over all their hay. Swedish turnips (2) night and morning were also given. They were well groomed and got walking exercise daily. Fresh water was kept before them.

On the 2nd day after the atoxyl injection the colt seemed uneasy and had slight pain. He refused food, was very thirsty, and seemed dull. After the saline injection he was easier, and ate a good feed that night.

From 7th—10th day (inclusive) all medicines were withheld, they being fed as above, well groomed, and exercised. On the latter day, one side of each was washed with a 5% cresol solution, and two days later the other side was done.

On the 11th day, the powders below-mentioned were commenced, and these were continued for 14 days.

MORNING POWDER.		NIGHT POWDER.	
P. Ferri Sulph.	ʒii	P. Ferri Sulph.	ʒii
P. Pot. Antim. Tart.	ʒi	P. Nux. Vom.	ʒi
P. Arsenic Alb.	grs. vi	P. Gentian	ʒiii
P. Foenugrec od	ʒvi	P. Anisi	ʒii
m.f.t. pulv. i		m.f.t. pulv. i	

On 14th and 21st days the grs. vi arsenic were withheld, and grs. xv atoxyl given hypodermically.

They remained under observation for 27 days altogether, and were then taken home. A week later they were then given grs. xv each atoxyl.

Symptoms while under treatment :—

After the 1st day's treatment, "red worms" were numerous in the dung of both, and chiefly on the outside of the ball. Daily they became more numerous, and by the end of the first week many thousands must have been got rid of. At first practically all the worms were alive and gorged with blood, but later about one-fourth of their number were dead and white in colour.

After the 1st week the numbers got less, and several lots of drop-pings contained none at all. From 14th to 18th day, no worms could

be found, but on the 19th they were again present, though only 4 or 5 in each dropping.

At the time the horses went home, no worms had been seen for three days. The owner informed me that he found an odd worm or two from time to time later on.

As to the animals themselves on arrival in hospital the colt was much the worse of the two. After the first week he improved daily. He got brighter, his pulse got stronger, and the visible membranes began to lose their unhealthy watery condition. He improved much the quicker of the two. Their skins both cleared up slowly, the dry scurfiness gradually disappearing, until when they were sent home they looked well, and were in good condition. On my visit a week later, they were still improving, and since then I saw the filly sold, and she was looking very well. The colt has been broken in, and is working daily, and, to use the owner's words, is "as fat as a butter ball." He has passed no more worms, but whether he is cured or not the writer would not care to say.

P.S. If asked, could the writer pass the colt as "sound" if otherwise all right?

NOTE ON THE EFFECT OF TRAIN JOURNEY DURING THE WINTER MONTHS AND THE TIME ELAPSING BETWEEN DETRAINING AND ACTUAL EMBARKATION ON THE PREVALENCE OF PNEUMONIA ON BOARD SHIP.

DURING the eight months when I was acting as Veterinary Embarkation Officer at the Port of Alexandria, the intimate relationship which exists between a railway journey in cold weather, undertaken immediately prior to embarkation, and the mortality on the sea voyage, has been impressed on my mind.

It is to be granted that there are other factors which also determine the percentage of deaths. One boat may be a much better "horse boat" than another—the ventilation and drainage varies—the weather also has to be considered, and the direction of the prevailing wind; but taking all these factors into consideration, and making allowances accordingly, it is obvious that if horses are shipped immediately, or soon after coming off a long railway journey, a considerable mortality is to be expected.

One does not have to seek far afield for an explanation. The fact that these horses travel for some hours in open trucks, exposed to inclement weather, must reduce the irrisistance to the lowest degree. They are placed on board immediately or soon after their arrival at the port under unfavourable conditions, and any organisms of

TABLE ILLUSTRATING THE EFFECT OF A TRAIN JOURNEY AND TIME ELAPSING BETWEEN
DETRAINING AND ACTUAL EMBARKATION, ON MORTALITY AMONGST ANIMALS ON BOARD SHIP.

Date	Port of Embarkation.	Transport.	Duration of train journey prior to Embarkation.	Time elapsing between detrain- ing and actual embarkation on Transport.	No. of Animals Embarked.		Number of Animals Disembarked.		Number of Deaths.		Cause of Deaths.	Sent to Veterinary Hospital.
					Horses.	Mules.	Horses.	Mules.	Horses.	Mules.		
8/2/16	Marseilles.	<i>Swada.</i>	48 hours.	18 hours.	290	...	289	...	2	...	P.	7-P. and 1-X 27-P. and S.P.
8/2/16	"	<i>Nationian.</i>	33 "	42 "	308	...	394	...	4	...	2-S.P. and 2-P	15
14/2/16	"	<i>Maryland.</i>	50 "	50 "	612	...	610	...	2	...	1-S.P. and 1-P.	4
14/2/16	"	<i>Missouri.</i>	50 "	16 "	533	57	526	57	7	...	5-S.P. and 2-P	4
16/2/16	"	<i>Botanist.</i>	52 "	14 "	438	...	434	...	4	...	1-P., 1-S.P., 2 Enteritis.	1
18/2/16	"	<i>Tintoretto.</i>	49½ "	92 "	463	...	463	...	...	...	.....	.....
21/2/16	"	<i>Karoo.</i>	50 "	144 "	228	70	228	70	12	...	10-S.P., 2-X., 4-S.P., 1-P.	25
22/2/16	Devonport.	<i>Port</i>	48 (Unit A	nil.	277	...	265	...	5	...	2-P	8
19/2/16	Avonmouth.	<i>Macquarie.</i>	6 (" B)	"	163	...	158	...	2	...	6-S.P., 10-P.	3
25/2/16	Devonport.	<i>Huanchaco.</i>	nil.	"	430	...	428	...	16	...	1-P.	22-X
26/2/16	Marseilles.	<i>City of</i>	15 (Unit A)	"	96	18	95	18	...	...	1-P., 1-X.	15
27/2/16	"	<i>Edinburgh.</i>	6 (" B)	"	544	230	440	230	2	...	20-S.P., 10-P. and 4-X.	33-P., 3-X.
1/3/16	Devonport.	<i>Crispin.</i>	nil.	"	442	52	406	52	34	...	P-7, E-6, 1-X.	4-X.
10/3/16	"	<i>Minomine.</i>	13 hours.	"	440	94	518	94	14	...	.....	.....
11/3/16	Marseilles.	<i>Kabinga.</i>	24 "	"	531	9	213	9	...	...	.....	.....
		<i>Knight of the Garter.</i>	nil.	"	213	...	213	...	...	...	.....	.....

S.P. = Septic Pneumonia.
P. = Pneumonia.

X = Catarrhal Fever.
E = Purpura.

pneumonia that may be present have an excellent opportunity of making a successful invasion of the tissues. If the animals are rested for two or three days before being placed in this "incubator" they will have regained a large proportion of their resisting powers, and will be more able to resist infection than if they were placed on board immediately on arrival.

Horses should only be placed on board ships when they are in their best condition, *i.e.*, when their powers of resistance are at their highest. This can be considerably helped by keeping animals which have come off a train journey of many hours duration at the Port of Embarkation until they have regained their normal condition.

A rest of two or three days will enable the Veterinary Officer to evacuate those animals which show a rise in temperature, and are in all probability sickening for either equine influenza or pneumonia—the result of the train journey.

Some of the units which arrived at Alexandria in February, 1915, had clipped all their horses prior to entraining them—knowing that they were destined for Egypt. These unfortunate animals were then trucked without rugs, and brought from the North of Scotland to the South of England—in some cases in a blizzard. They were immediately embarked—the ship soon becomes hot—the air is more or less stagnant, and in a few days pneumonia, usually of a septic variety, appears. The boat is then blamed for being infected with septic pneumonia. In my opinion the infection theory is much exaggerated. A boat will bring a number of animals from, say, Marseilles, that have come off along railway journey. The mortality is high. The boat returns to Marseilles and immediately ships horses from the Remount Depot there. These horses have not undergone a long rail journey. The result is that this boat which has been blamed for being infected with septic pneumonia arrives in Alexandria without having lost an animal. This I have observed time after time. A glance at the attached table—showing the records of fifteen voyages under similar conditions, will help to prove the truth of the preceding remarks.

Translations and Abstracts.

EXPERIMENTS WITH REPEATED DOSES OF OIL OF CHENOPODIUM.*

By MAURICE C. HALL, PH.D., D.V.M.,
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THE superiority of oil of chenopodium as an ascaricide to other ascaricidal anthelmintics, when suitable doses of the involved drugs

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are compared, has been experimentally established for the dog by the work of Hall and Foster in the Bureau of Animal Industry, and of Hall in this laboratory, for swine by Hall and Foster (most of the work on swine was done by Foster), and has been clinically established in the case of man by numerous observations of physicians here and in the tropics. In the case of the ascarid of the horse, Hall, Wilson, and Wigdor found chenopodium superior to most of the drugs commonly used, and work by Hall, Smead, and Wolf, to be published in a paper in this series, shows carbon bisulphide superior to chenopodium.

The therapeutic dose of oil of chenopodium for removing ascarids from dogs has been found by the writer to be 0.1 m.p.k. (mil per kilo). In this dosage, experiments on dogs indicate that it is inferior to chloroform in single therapeutic dose of 0.2-0.3 m.p.k. in removing hookworms. In human medicine, it has been found necessary to give chenopodium in repeated doses, usually at hour intervals, in order to remove hookworms, and even under such conditions, several treatments are not infrequently necessary. To determine the method in which chenopodium could be successfully employed against a hookworm in the dog and to secure further data as to the anthelmintic action of this drug, the following experiments were performed:

Chenopodium in Doses Repeated Over a Number of Days.

Dog No. 153, weighing 16 kilos, was given 2 minims of chenopodium in 1 dram of castor oil daily for a total of 12 treatments in 13 days. The dog had distemper and died two days after the last treatment. No worms were passed. There were seven whipworms postmortem. Treatment was therefore 0 per cent. effective against whipworms.

Dog No. 158, weighing 16 kilos, was given the same treatment daily for a total of 17 treatments in 20 days, and killed the day after the last treatment. The dog passed no worms and had six whipworms postmortem. Efficacy against whipworms, 0 per cent.

Dog No. 152, weighing 12 kilos, was given the same treatment daily for a total of 18 treatments in 20 days, and killed three days after the last treatment. The dog passed one hookworm on the twelfth day after beginning treatment. It had 14 *Dipylidium* postmortem. Efficacy against hookworms, 100 per cent.; against *Dipylidium*, 0 per cent.

Dog No. 154, weighing 15 kilos, was given the same treatment for a total of 18 treatments in 20 days, and killed three days after the last treatment. Through the eight days after the first treatment, the dog passed a total of eight hookworms and none thereafter. Postmortem it had seven hookworms and 41 *Dipylidium*. Efficacy against hookworms, 52 per cent.; against *Dipylidium*, 0 per cent. It is remarkable that over half of the hookworms should yield to

seven treatments and the remainder resist a total of 18 treatments, but this is in keeping with the difficulties and uncertainties of hookworm treatments as shown in numerous other experiments.

Dog No. 155, weighing 9.5 kilos, was given the same treatment for a total of 18 treatments in 20 days, and was killed three days later. In the first three days after the first treatment, the dog passed two hookworms and one was found in the large intestine postmortem. The dog had two other hookworms, 19 whipworms, and three *Dipylidium* postmortem. Efficacy against hookworms, 60 per cent.; against whipworms and *Dipylidium*, 0 per cent. This shows the same peculiarities as regards the resistance of individual hookworms to treatment.

Dog No. 156, weighing 9 kilos, was given the same treatment for a total of 18 treatments in 20 days, and killed three days later. The second day after the first treatment, the dog passed one ascarid. No worms were found postmortem. Efficacy against ascarids, 100 per cent.

Dog No. 157, weighing 12 kilos, was given the same treatment for a total of 19 treatments in 23 days, and killed one day later. The ninth day after the first treatment, the dog passed one whipworm. The dog had 16 whipworms postmortem. Efficacy against whipworms, 6 per cent.

Dog No. 159, weighing 14 kilos, was given the same treatment for a total of 19 treatments in 23 days, and killed one day later. The dog passed no worms and had one *Dipylidium* postmortem. Efficacy against *Dipylidium*, 0 per cent. The preliminary fecal examination of this dog showed fluke eggs; no flukes were detected in the daily examination of the feces or postmortem. However, these flukes, a species of *Alaria* (*Hemistomum*), are very small, not difficult to detect postmortem, but likely to be destroyed in feces and unrecognisable, and it is likely that the treatment removed them.

Dog No. 162, weighing 12.75 kilos, was given five minims of oil of chenopodium in the soft, or soluble, elastic capsule, followed immediately by two drams of castor oil, daily, for a total of 12 doses in 13 days, and was killed five days later. The second day after the first treatment, the dog passed one whipworm. It had two *Dipylidium* postmortem. Efficacy against whipworms, 100 per cent.; against *Dipylidium*, 0 per cent.

Dog No. 163, weighing 15 kilos, was given the same treatment for a total of 12 treatments in 13 days, and was killed five days later. The third day after the first treatment, the dog passed one hookworm, and one *Dipylidium* was found in the cecum postmortem. There were 97 other *Dipylidium* postmortem. Efficacy against hookworms, 100 per cent.; against *Dipylidium*, 1 per cent.

Dog No. 164, weighing 15 kilos, was given the same treatment for a total of 12 treatments in 13 days, and was killed five days later. The second day after the first treatment, the dog passed one hookworm. It had three *Dipylidium* postmortem. Efficacy against hookworms, 100 per cent. ; against *Dipylidium*, 0 per cent.

Dog No. 165, weighing 14.5 kilos, was given the same treatment for a total of 12 treatments in 13 days, and was killed five days later. The fifth day after the first treatment, the dog passed one whipworm. It had seven whipworms and five *Dipylidium* post-mortem. Efficacy against whipworm, 13 per cent. ; against *Dipylidium*, 0 per cent.

Dog No. 166, weighing 12 kilos, was given the same treatment for a total of 12 treatments in 13 days, and was killed two days later. In the five days after the first treatment, the dog passed 29 ascarids, and in the three days after the first treatment, passed 24 *Dipylidium*. It had one whipworm postmortem. Efficacy against ascarids and *Dipylidium*, 100 per cent. ; against whipworms, 0 per cent.

Dog No. 167, weighing 14.5 kilos, was given 12 treatments in 13 days, and was killed two days later. In the two days after the first treatment, it passed two ascarids, and in the 11 days after the first treatment, it passed 54 whipworms. It had 12 whipworms and one *Dipylidium* postmortem. Efficacy against ascarids, 100 per cent. ; against whipworms, 82 per cent. ; against *Dipylidium*, 0 per cent. Owing to an accident while collecting worms postmortem, some whipworms may have been lost, but the efficacy was about 75 per cent. or more.

Dog 168, weighing 11.5 kilos, was given the same treatment for a total of 12 treatments in 13 days, and was killed two days later. The day after the first treatment, the dog passed two ascarids, and the tenth day after the first treatment it passed three whipworms. It had no worms postmortem. Efficacy against ascarids and whipworms, 100 per cent.

Dog No. 169, weighing 12 kilos, was given the same treatment for a total of 12 treatments in 13 days, and was killed two days later. The day after the first treatment, the dog passed two ascarids. It had one *Dipylidium* postmortem. Efficacy against ascarids, 100 per cent. ; against *Dipylidium*, 0 per cent.

Dog No. 283, weighing 11.5 kilos, was given five minims of oil of chenopodium in soft (soluble elastic) gelatine capsules, followed by 15 mls of castor oil. Treatment was repeated on the third, fifth, and seventh day thereafter. The dog was found dead three days after the last treatment. In the eight days following the first treatment, the dog passed three hookworms. It had 11 hookworms postmortem. Efficacy against hookworms, 21 per cent.

Dog No. 228, weighing 8 kilos, was given chenopodium at the rate of 0.05 m.p.k., with 30 mils of castor oil. The next day the dose was repeated and the dog was killed six days after the second treatment. On the day following the second treatment, the dog passed five hookworms, and in the four days following the first treatment, it passed 31 whipworms. It had 16 hookworms, 175 whipworms, and two *Dipylidium* postmortem. Efficacy against hookworms, 24 per cent.; against whipworms, 15 per cent.; against *Dipylidium*, 0 per cent.

Chenopodium in Doses Repeated During One Day.

(Of the following seven experiments, the four with dogs 293, 294, 299 and 309 have already been published in another paper. They are repeated here for the sake of completion.)

Dog No. 293, weighing 12 kilos, was given one 10-minim soft gelatine capsule of chenopodium every hour for a total of three doses, and the last dose was followed an hour later by 15 grams of Epsom salts in simple syrup. During the next two days the dog passed four hookworms, and was killed the fourth day after treatment. It had no worms postmortem. Efficacy against hookworms, 100 per cent.

Dog No. 294, weighing 16 kilos, was given a 10-minim capsule of oil of chenopodium with $\frac{1}{2}$ grain of cascarn; this was followed an hour later by a 10-minim capsule of chenopodium and another $\frac{1}{2}$ grain of cascarn. In the next four days the dog passed three hookworms and one whipworm. It had one hookworm, 21 whipworms, and six *Tania pisiformis* postmortem. Efficacy against hookworms, 75 per cent.; against whipworms, 5 per cent.; against tapeworms, 0 per cent.

Dog No. 299, weighing 15 kilos, was given one 10-minim soft capsule of chenopodium every hour for a total of three doses, and was fed uncooked meat immediately after each dose to see if it afforded protection against the drug in the absence of purgation and also diminished the efficacy. The day after treatment, the dog passed five ascarids and three hookworms. It was killed the fourth day. It had five hookworms. Efficacy against ascarids, 100 per cent.; against hookworms, 37.5 per cent.

Dog No. 314, weighing 6 kilos, was given one 10-minim soft capsule of chenopodium at 8.30 a.m., and immediately fed some uncooked beef heart and bread. At 2.0 p.m. the dog was given a second 10-minim capsule and offered food, but refused it. At 4.35 it was given a third capsule and food. At 9.0 a.m. the next day the dog was given 30 mils of castor oil. This was an attempt to determine the effects in the administration of a capsule before each meal, advocated by some physicians in human cases of hookworm. The dog passed two ascarids the day after treatment, and was killed the fourth day. It had no worms postmortem. Efficacy against ascarids, 100 per cent.

Dog No. 309, weighing 14 kilos, was given one 10-minim soft capsule every half hour for a total of three doses, the last dose being followed a half hour later by 30 mils of castor oil. At an undetermined interval after getting the castor oil, the dog broke out of its cage and ate some food. No worms were passed. The dog was killed the fifth day. It had two hookworms and six whipworms. Efficacy against hookworms and whipworms, 0 per cent.

Dog No. 148, weighing 13 kilos, was given one 10-minim soft capsule of chenopodium every hour for a total of three doses, the last dose being followed immediately by 30 mils of castor oil. The dog passed no worms and was killed the fourth day. It had six whipworms. Efficacy against whipworms, 0 per cent.

Dog No. 151, weighing 13 kilos, was given one 5-minim soft capsule of chenopodium every hour for a total of three doses, the last dose being followed immediately by 30 mils of castor oil. The dog passed one hookworm the day after treatment, and two whipworms the third or fourth day after treatment. The animal was killed the fourth day. It had one whipworm postmortem. Efficacy against hookworms, 100 per cent. ; against whipworms, 67 per cent.

Where very small doses of chenopodium, two minims, were given daily for a total of 12 (one case), 17 (one case), 18 (four cases), and 19 (two cases) treatments, the efficacy against ascarids was, as usual, 100 per cent. ; against hookworms, 100, 60, 53, and 0 per cent. ; against whipworms, 6, 0, 0, 0, and 0, per cent. ; against *Dipylidium*, 0 per cent. (five times). These experiments confirm the idea that chenopodium is successful against ascarids almost always, that repeated doses increase its efficacy against hookworms, and that it should not be regarded as a tæniacide. They also bear out the writer's suggestion that santonin is the remedy of choice for whipworms, as even these numerous treatments with small doses of chenopodium fail to remove these worms in most cases.

Where larger doses of chenopodium, five minims, are given daily for 12 doses, the drug shows the expected efficacy against ascarids, 100 per cent. (4 cases) ; an efficacy against hookworms of 100 per cent. (two cases) ; against whipworms, 100 (two cases), 75 to 82, 13 and 0 per cent. ; and against tapeworms, 100, 1 and 0 (five cases) per cent. The efficacy against tapeworms is to be expected, the base of 100 per cent. efficiency against tapeworms is an accident, out of keeping with numerous failures on the part of this drug to remove any tapeworms whatever ; the whipworm findings indicate that repeated doses of five minims daily are much more effective than two minims daily ; the findings for hookworm are based in both cases on a single hookworm and so are inconclusive.

A test of this same 5-minim dose every other day for four days showed 21 per cent. efficacy against hookworms.

A test of half the therapeutic dose (0.1 m.p.k.), or 0.5 m.p.k., given on two successive days, showed 24 per cent. efficacy against hookworms, 15 per cent. against whipworms, and 0 per cent. against *Dipylidium*.

In the repeated doses given in one day, three 10-minim doses at hour intervals, followed by Epsom salts, were 100 per cent. effective against hookworm, and 67 and 0 per cent. effective against whipworms; the same dose, given with cascarn, was 75 per cent. effective against hookworms, 5 per cent. effective against whipworms, and 0 per cent. effective against tapeworms; the same dose with meat, but without purgation, was 100 per cent. effective against ascarids and 37.5 per cent. effective against hookworms; the same dose, given three times during the day with food, was 100 per cent. effective against ascarids; the same dose, given every half hour and followed a half hour later by castor oil, was 0 per cent. effective against hookworms.,

The foregoing suggests that chenopodium in repeated doses of five minims daily for 12 doses is rather efficacious against ascarids, whipworms, and, probably, hookworms. But such prolonged treatment is objectionable from the standpoint of the practitioner. The use of three 10-minim doses at hour intervals, followed by a purgative an hour later, gives promise of success in treating dogs as in treating man for hookworms, but, even as in that case, repeated treatments will not infrequently be necessary. This subject demands more data. Prolonged experience to date only enables us to formulate the following statements with regard to oil of chenopodium:

Oil of chenopodium has no equal as a drug for the removal of ascarids, as it will in the big majority of cases remove 100 per cent. of the worms present in the dog, and is apparently about as effective, under proper conditions of administration, against ascarids of man and swine. It is apparently as effective as anything against ascarids in the horse and will probably give satisfactory results when it has been sufficiently studied to ascertain the proper dose and mode of administration.

Chenopodium does not have, in our experience, as much value for removing hookworms in single therapeutic dose as does chloroform, but such experimental evidence as we have, together with the clinical evidence of thousands of human cases treated with chenopodium, indicates that in repeated doses, either at hour intervals or on consecutive days, it should prove reasonably satisfactory against hookworms in dogs.

No drug can be depended on to remove whipworms when given in single dose, as the writer has stated elsewhere. Repeated doses of oil of chenopodium, five minims daily for 12 days, for instance, seem to give rather good results and warrant further investigations along this line. But the fact that santonin is not a gastro-intestinal irritant gives it the choice for use against whipworms, so far as we are aware at present. It can be given in doses of a half-grain or a grain daily, with equal amounts of calomel, and seems entirely safe when so used, so far as our experiments show.

Chenopodium will occasionally remove tapeworms, but the numerous failures to remove any in a long series of experiments show positively that it cannot be regarded as a suitable anthelmintic for the removal of tapeworms, so far as dog tapeworms are concerned, and so far as findings in regard to them can be applied to other tapeworms and hosts.

EPIZOOTIC ABORTION ORDER OF 1920.

COUNTY OF LANARK.

EPIZOOTIC ABORTION is a highly contagious disease, caused by the *Bacillus Abortus* (Bang.). The chief predilection habitat of the bacillus is the womb of the pregnant animal, where it sets up a specific inflammatory or catarrhal condition that usually leads to the premature expulsion of the calf, and very often before a viable age has been reached. The foetus, the membranes, and discharge are highly infective, and the post-birth discharge is virulent for some time, but Sir Stewart Stockman says that many cattle get rid of all infective material from the genital organs in two or three months.

When one or two cases of premature calving have occurred in a herd, hitherto free from abortion, a simple blood test can determine whether or not the cause is specific—i.e., whether it is a case of Contagious Abortion, or of accidental abortion only. If several cases in a herd occur within a short time, the existence of Contagious Abortion may be considered as certain without any blood test.

No case of Contagious Abortion can possibly occur without direct or indirect contact with an antecedent case. Natural infection occurs either by the mouth or the genital tract. Though infection by the alimentary tract is most common by far, there is little doubt that a bull may be a mechanical carrier, or, being infected in the testes, will eject bacilli with his semen. Infection *via* the genital tract, apart from the agency of the bull, used to be considered very general, but is now held to be negligible. It has been estimated that twenty per cent. of the herds in this country are affected with the disease,

but no accurate estimate of its prevalence could be made without the aid of a compulsory Notification Order, for it is notorious that its existence in many herds is kept secret.

Of all the unscheduled contagious diseases of bovines—excepting Tuberculosis, the Order in connection with which is meantime in suspension—Epizootic Abortion is the one that prevails most generally in Great Britain. The opinion expressed by many people, on first thought, that the disease is one which is clearly marked out for control by means of a comprehensive Order is not an unnatural one. Indeed, many stock-owners, as well as many veterinarians—without, perhaps, giving the subject the consideration it deserves—still hold the view that the absence of an Order designed to exercise complete control over a scourge so baneful to the breeding and dairying industries is quite unjustifiable. Such a view was fostered in the mind of many people, and perhaps owed its inception in some cases to the second report of the Departmental Committee on Epizootic Abortion, of date June, 1910, which recommended that, as a preliminary measure, the disease in cattle should be dealt with under an Order of the Board of Agriculture and Fisheries, requiring :—

- (a) Compulsory notification of suspected cases of the disease ;
- (b) Veterinary inquiry to establish the existence of disease on any particular premises ; and
- (c) Temporary isolation and restrictions on the movement of any cow that has recently aborted.

However, since the issue of that report, responsible opinion has travelled a considerable way.

Additional weight was given to the claim of the stockowner for a comprehensive Order by the unfortunate recommendation of the Travelling Commission of Enquiry into the Cost of Production of Milk, contained in their report published last spring. When sitting at Exeter, the Commission was informed of the operation in Devonshire of the Devonshire Epizootic Abortion Order of 1916, and they advised that the measures adopted against the disease in Devon should be extended to the rest of the country, without assigning any cogent reason.

Whether the operation of the Devonshire Order has produced any good results is a matter of grave doubt, and, indeed, it has been asserted that, while its administration has involved very considerable expense, and has been a source of irritation to local farmers, no appreciable benefits have accrued. Further, it is reasonable to suppose that, if the Order in question has achieved the objects for which it was designed, the Ministry of Agriculture would not have been slow to make a General Order applicable to the whole country, or at least

to have recommended Local Authorities to consider the advisability of applying for an Order of similar effect.

What considerations then have prompted the issue of the Epizootic Abortion Order of 1920, and what results are Local Authorities likely to attain in controlling the disease by making regulations under it ?

The Order, as will be observed on a careful reading of it, is of a very restrictive character, and one may be excused from regarding it as a slight concession by the Ministry of Agriculture and Fisheries to appease an importunate public clamouring for compulsory power for the control of the disease. The order confines itself to :—

- (i) prohibiting the exposure by any person in any market, fair-ground, or saleyard within the district of the Local Authority of a cow or a heifer which, to his knowledge, or according to information furnished to him, has calved prematurely within the two months immediately preceding such exposure ; and
- (ii) prohibiting the sale by any person, within the district of the Local Authority, of a cow or heifer which, to his knowledge or according to information furnished to him, has calved prematurely within two months immediately preceding such sale, unless, before the sale, he shall have given to the purchaser notice in writing of such premature calving.

The words “ has calved prematurely ” are very significant and materially simplify the definition of an animal amenable to the Order. Animals that are known to have calved prematurely, whether the cause be specific or accidental, are amenable. To have limited it to aborting animals—the subject of Epizootic Abortion—would have caused endless worry and expense in the matter of proof. On the other hand the inclusion within the scope of the Order of animals that have aborted, whether the cause may have been specific or otherwise, is well advised, as a cow that has aborted from accident, though free from the specific disease, is rarely worth the money the unprincipled seller gets for it.

Regulations made under the Order, if strictly enforced, should have the effect of compelling individuals who hitherto have not scrupled to sell as correct, animals that were highly infective and incidentally destined to a short period of lactation, to mend their ways. Further, the prohibition of the public exposure for sale of such animals will operate to prevent the spread of the disease to free herds, to emphasise publicly its infectious character, and give confidence to purchasers at public marts.

There is no obligation on the owner of infected animals to notify the existence of disease in his herd. Indeed, he may sell privately,

within two months after the Act, a cow that has calved prematurely through being the subject of Epizootic Abortion, provided that, prior to the sale, he notifies the fact in writing to the intending purchaser.

The Order is good so far as it goes, but it cannot be expected to influence materially the spread of Contagious Abortion.

It is worthy of note that this very simple Order does not seek to control such a dangerous animal as the cow that is about to abort, and it is notorious that some owners of infected herds in which abortions occur about or after the eighth month of gestation do not hesitate to hasten to the market and sell without remark the animal that exhibits the symptoms of impending abortion, and many such have an appearance of milk equivalent to that of a cow that has gone her full time. The purchaser may be able to prove when the cow is delivered of her calf at his place that abortion has occurred and get the cow returned, but in the meantime his premises may have been fouled and an outbreak of abortion may result.

Any Order which had for its object the effective control of this disease would require to provide for compulsory notification and veterinary inquiry, and if this proved positive a prolonged period of inspection, quarantining and repeated disinfection of infective cows and premises, cessation of movement of animals for a considerable time, and the eradication of the disease would seem to be impossible without the slaughter of every cow that has aborted.

When one is aware of the wide extent of the sources of infection, the effect on the dairying industry of the country of an Order containing provisions of the nature indicated could only be regarded with the most serious apprehension.

Even if an Order—bereft of its article providing for the slaughter of infective and potentially infective animals, but more comprehensive than the Epizootic Abortion Order of 1920—were enforced, the existence of the disease would still continue. Moreover, its articles on notification, veterinary inquiry, restriction of movement, etc., would provide many problems that at the present time seem insurmountable, since the attempt to solve them would paralyse milk production. For example, consider the effect of a restriction notice served on the owner of a large number of back-calving cows at grass if abortion began, as it very often does, and the owner had no premises in which to tie up and milk the cows that were slipping their calves day by day.

If it be conceded then that these objections, which are by no means exhaustive, are sufficient to rob us of the desire for such an Order, it may be urged that this new Order might, with good reason, have included at least compulsory notification of disease. That, however,

would not help matters much, and, as failure to notify would constitute an offence, it might, as is alleged in Devon, have the effect of keeping stock-owners from applying for vaccine treatment.

It has been suggested that compulsory vaccination should be linked to compulsory notification, and that the list of infected farms, etc., should be published by Local Authorities. Such measures would probably materially reduce the havoc caused by the disease, but power has never yet been granted in this country to inoculate any animal with serum or vaccine or Tuberculin or Mallein without the full consent of the owner. Further, mere notification of the disease would in itself effect little or no good.

It is becoming more evident that stock-owners, who fear the disease most, understand fairly well how to protect their herds. Every farmer should read the "Leaflet No. 108" on Epizootic Abortion, issued by the Ministry of Agriculture and Fisheries, and act on the advice given therein. Perhaps, however, it may not be out of place here to set down a few precautions that owners of herds free from abortion disease would do well to observe :—

1. Contact of the herd with strange animals should not be allowed.
2. Refuse the use of the bull to strange cows, and don't mate cows with a strange bull. If special circumstances create an exception, apply measures of disinfection to the bull.
3. Isolate and prove every bought-in dairy cow, and if a newly-born calf is bought it should also be isolated, and its dejecta disinfected for a period of ten days.
4. Be careful of grazing pregnant cows on common pasture where they may be exposed to infection.
5. Avoid soiling of fodder by strange persons or dogs or other animals coming about the premises.
6. If any cow calves prematurely or shows signs of impending abortion, isolate her at once and call in a veterinary surgeon to treat her, adopt measures of disinfection, and take a sample of blood to test the nature of the case.
7. The vaccine, "Anti-Abortion A," should not be used as a preventive in a clean herd.

The Epizootic Abortion Order of 1920 will, if taken advantage of by Local Authorities generally, help a little to limit the spread of the disease, but past experience and the present position of matters suggest that it would be unwise to extend its scope in the near future.

Despite certain accidental drawbacks (only occasionally met with) to the use of vaccine for the prevention and control of Contagious

Abortion, the experience gained in Lanarkshire in upwards of one hundred outbreaks and the statistics of others who have also used it extensively in conjunction with efficient measures of disinfection, serve to show that the vaccine, "Anti-Abortion A," prepared by Sir Stewart Stockman at the laboratory of the Ministry of Agriculture and Fisheries, is a most efficient agent in combating an outbreak of the disease. The vaccine is supplied on demand at a cost that is only sufficient to defray the expense of carriage. Measures should be adopted to extend the use of vaccine in infected cow-sheds, and an endeavour should be made to educate stock-owners further regarding the nature of the disease.

HUGH BEGG,
F.R.C.V.S

County Offices, Hamilton,
March, 1920.

A BILL TO AMEND THE ACTS RELATING TO THE PRACTICE OF VETERINARY SURGERY AND MEDICINE.

Whereas it is desirable to provide further funds for the Royal College of Veterinary Surgeons to enable it to conduct examinations, prosecutions and inquiries authorised by statute, and generally to carry out such other objects or duties as may be considered beneficial to the veterinary profession and necessary for the promotion of the art and science of veterinary medicine and surgery :

And whereas doubts have arisen whether persons registered as existing practitioners under section fifteen of the Veterinary Surgeons Act, 1881, are subject to the jurisdiction of the Royal College of Veterinary Surgeons as conferred on them by that Act in respect of persons on the Register of Veterinary Surgeons :

And whereas it is desirable that persons registered as existing practitioners shall be entitled to style themselves veterinary surgeons :

And whereas the profession of veterinary surgeons is not protected from unqualified persons practising as such under the cover of registration under the Joint Stock Companies Acts :

Be it therefore enacted by the King's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this Parliament assembled, and by the authority of the same as follows :—

1.—This Act shall be supplemental to and read with the Veterinary Surgeons Act, 1881 (hereinafter called the principal Act), and the

Veterinary Surgeons Amendment Act, 1900, and may be cited as the Veterinary Act (1881) Amendment Act, 1920, and shall come into operation on the first day of October one thousand nine hundred and twenty.

2.—(1) An annual fee of one guinea shall be payable on the first day of April in each year or on such other date as the council of the Royal College of Veterinary Surgeons may from time to time determine, by every member of the Royal College of Veterinary Surgeons, save as excepted in sub-section (4) hereof, such fee to be paid to the registrar of the Royal College of Veterinary Surgeons on or before the thirtieth day of April, or such other day as the said council may from time to time determine, in each year. On receipt of such fee the registrar shall cause to be posted to the member paying the same a copy of the Register of Veterinary Surgeons free of all cost.

(2) If the annual fee of any member shall not have been paid on or before the thirtieth day of April (or such other day as the said council may from time to time determine) in any year, the registrar shall send to such member by registered post at the address given in the Register of Veterinary Surgeons for the time being, or to any other address of which written notice shall have been given by such member to the registrar, a notice requiring payment, and if such payment shall not be made within one month from posing such notice a final notice shall be sent to such member by registered post.

(3) If any member of the Royal College of Veterinary Surgeons shall not have paid such annual fee for the time being within one month from the posting of the final notice mentioned in the last preceding subsection, thereupon such unpaid fee shall become and be a debt due and payable to the Royal College of Veterinary Surgeons at the then existing head office of the college, and if the member so making default be ordinarily resident or domiciled in England or Wales may be sued for and recovered in the county court having jurisdiction over the district in which the said office may for the time being be situate, and if the member so making default be ordinarily resident or domiciled in Scotland such debt may be sued for and recovered in the sheriff court of the sheriffdom of the Lothians and Peebles at Edinburgh, and if the member so making default be ordinarily resident or domiciled in Ireland such debt may be sued for and recovered in the Civil Bill Court in Dublin: Provided always that the council shall have power to withhold such proceedings for the recovery of the said fee in cases in which in the opinion of the council the member is unable to pay. In any such proceedings a certificate purporting to be under the hand of the secretary of the

college setting forth that a member's subscription is due and unpaid shall be prima facie evidence thereof and of a member's default in payment.

(4) This section shall not apply to members of the Royal College of Veterinary Surgeons who do not practise in the United Kingdom or to holders of the veterinary certificate of the Highland and Agricultural Society who have been or may hereafter be admitted as members of the Royal College of Veterinary Surgeons in conformity with clauses one and two of the supplemental charter of 1879 granted to the Royal College of Veterinary Surgeons, or to existing practitioners as defined in section fifteen of the principal Act.

(5) The council of the Royal College of Veterinary Surgeons shall forthwith prepare and pass byelaws for the disposition of the money from time to time received in respect of the annual fee, and shall have power from time to time to add to, vary, and alter the same (such byelaws, additions, variations, and alterations to be made and carried out subject to the conditions prescribed in the charter of the college dated eighth March eighteen hundred and forty-four) : Provided always, that such byelaws and any alterations thereto shall have no force or validity until the same shall have been submitted to, and approved by, the Privy Council.

3.—From and after the commencement of this Act all persons duly registered as existing practitioners, in accordance with section fifteen of the principal Act, and whose names are on the register kept for that purpose, shall be entitled to style themselves veterinary surgeons, and shall be subject to the jurisdiction of the Royal College of Veterinary Surgeons in all respects and in like manner as if they were members of the Royal College of Veterinary Surgeons, and shall be liable in like manner to have their names removed from the register of existing practitioners by the council of the said college, and shall in like manner be bound by any byelaws already made, and which may hereafter be duly made defining what amounts to conduct disgraceful in a professional respect within the meaning of section six of the principal Act.

4.—Anything which would be an offence under the Veterinary Surgeons Act if committed by an individual shall be an offence if committed by a company registered under the Companies Acts.

Reviews.

AMERICAN JOURNAL OF VETERINARY MEDICINE, MARCH, 1920.

Published monthly at 9, South Clinton Street, Chicago, U.S.A.

Price, Canadian and Foreign, 4 dollars a year.

This up-to-date periodical is full of interesting matter. A short review of "The Present Status of the Live Stock Industry of the United States," by H. R. Smith, Chicago Live Stock Commissioner, shows that increased land cultivation has caused a reduction of 30 per cent. in the total number of beef cattle, and prices have risen 55 per cent. There were 75,587,000 hogs in the country at January 1st, 1919, and 25 per cent. of these were exported as pork to other countries. The greatest handicap to getting surplus pork to Europe is the high rate of exchange. Sheep raising is increasing, and about 3,000,000 more were available in 1919 as compared with 1918. The dairy industry improved considerably, and the demand for heavy horses was very satisfactory. The prevention and eradication of disease among live stock is receiving very earnest and well-organised attention. The "Queries and Answers" section of the journal is a well-used and very valuable one to the general practitioner. Any veterinary surgeon who is doubtful about a puzzling case, or thinks he might have done differently or better with an ordinary one, writes to the journal and gets an answer from the cattle, swine, or horse expert on the staff. Cases are also reported for their scientific value and for criticism. In the Cattle Section, "Chronic Endometritis" is comprehensively discussed, and in the Swine Section "Diseases Causing Loss of Suckling Pigs." "Matters of Current Interest" comprise Society Meetings and *Personalia*. An Army Bill is shortly to come before Congress, and it is expected that the legislative committee of the A.V.M.A. will be able to secure a satisfactory reorganisation and reconstruction of the Veterinary Corps. One marked feature of the journal is the large amount of advertising matter in it. From a financial point of view this must be very satisfactory, and although it does not quite harmonise with our professional ideas over here, yet it is gratifying to see how well supported materially the publishers are by workers in the fields of science and commerce.

G.M.

ANKYLOSTOMIASIS IN DOGS IN SIERRA LEONE. By Warrington Yorke and B. Blacklock.

"The Annals of Tropical Medicine and Parasitology," July 31, 1915, contains an interesting article on the above subject. Two parasites were found, *ankylostoma carinum* and *ankylostoma ceylanicum*, distinguished the one from the other by the characteristic arrangement of their teeth. The discovery of *A. ceylanicum* in the dog in Sierra Leone is of interest. It has been found in a civet cat from Colombo, in a dog and cat in Bengal and also in a lion from the Calcutta Zoological Garden, and has occasionally been found in human beings. *Ankylostoma ceylanicum* is the bigger of the two parasites. Infection

with ankylostominae of human beings is common in Sierra Leone, and investigation as to whether *A. ceylanicum* occurs in human beings is important in view of the dog reservoir of infection. Prophylactic measures must include the dog in their purview. G. M.

VETERINARY MEDICINE, No. 13. Edited by D. M. CAMPBELL, D.V.S. RABBIT AND CAT DISEASES. By CHARLES GREATLEY SAUNDERS, V.S., B.V.Sc., D.S.O. Published by American Veterinary Publishing Co., Chicago: 1920. Price 2 dollars.

The usefulness of this little book is beyond question. The ailments of cats are as important to the veterinarian as the malady of dogs, and much money has been laid out by fanciers and smallholders in rabbits.

The section on the rabbit is more complete than the one on the cat and comprises 8 chapters dealing with the rabbit in health, diseases of the digestive tract and skin, coccidiosis, infectious diseases, obstetrics, septicæmia and miscellaneous diseases and wounds. Some of the remedies prescribed for complaints strike us as not being free from danger, *e.g.*, filling up the auditory canal with nitrate of mercury ointment and olive oil in psoroptic and symbiotic mange and applying bichloride of mercury 1 in 500 for ringworm. We think less dangerous and quite as effective remedies might be used.

Something might have been said about the method of administration of medicine to rabbits. Both in rabbits and cats we have found that using glycerine as a base for the administration of other remedies is useful. The writer advises nauseous drugs to be given in pill or capsule form to the cat and also to introduce the index finger of the left hand into the corner of the lips in large cats. We have never managed to perform either of these feats in our feline subjects, because we have seldom been able to gain the confidence of the patient. In catarrh and bronchitis, which have been the chief ailments our own cats have suffered from, and which are not mentioned in the book, we have obtained excellent results by giving glyco-heroin in the milk. We miss any mention of our old friend "chylous ascites" in the cat in this book. It was the only cat complaint we ever heard mentioned when at college. On page 97 it is recommended to give 85 grains of santonin for tape worm. Surely this is a mistake.

The author has some useful remarks on the psychology of the cat and he attributes the well-known obstinate refusal of the cat to eat (the hunger-striker of the animal world) to nostalgia or in plain terms, "home-sickness." This accounts in some cases for the idiosyncrasy, but we are not satisfied that it is the full explanation. We think that there is the obstinate pride and true feminine way of expressing defiance or suspicion of all human good intentions strongly inherent in the cat.

It is very gratifying to know that a book has been published by a veterinarian on the diseases of the rabbit and cat. One of our number has at any rate appreciated the duty of the profession in the matter. If more of us could get the broad outlook and remember that we claim all the animal world and even birds and fish as our patients, our science would benefit and ignorance and quackery recede more into the background. G. M.

ANNUAL REPORT ON THE CIVIL VETERINARY DEPARTMENT, UNITED PROVINCES, FOR THE YEAR ENDING MARCH 31, 1919. Price 9d. Government Press, Allahabad.

MAJOR E. W. OLIVER, M.R.C.V.S., F.Z.S., Superintendent of the Department, sends us this report. Despite shortage of staff and epidemics of influenza, much good work has been done in the prevention and cure of animal disease. An experienced manager of the farms has been appointed and cattle and sheep breeding have been given a fillip thereby. The horse and pony stallions have been increased in number to 72. Although there has been a shortage of men owing to their absence on military duty, an increase has taken place in the number of hospitals and dispensaries maintained. Rinderpest, hæmorrhagic septicæmia, and foot and mouth disease caused the most trouble. During the year 35,320 cases of contagious disease were notified, 14,570 villages were visited by the travelling veterinary assistants, and 24,687 animals treated other than those reported on, and 316 animals were castrated. These figures give some idea of the valuable work compassed by the Veterinary Department.

G. M.

Personal.

Brigadier-General T. G. Peacocke, C.I.E., M.R.C.V.S., has recently been appointed Director-General of the Army Remount Department of India. This distinguished officer did very valuable work on the Remount Commission in Australia during the war, and is attached to the Indian Army. It is a great honour to our profession that one of its members should have been chosen to fill such a responsible position, especially in a country where horse breeding is carried on to a point of excellence unequalled in any other part of the world.

NOTICES.

All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C.2. Telephone: Gerrard 4646. Telegrams: "Baillière-Rand, London."

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THE VETERINARY JOURNAL

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JUNE, 1920.

Editorials.

THE VETERINARY SURGEONS' ACT (1881) AMENDMENT BILL.

IF the misguided opposition and misstatements of our opponents in connection with the above Bill have done nothing else, they have at least shown us where our friends are to be found, and the Bill, having passed its Third Reading, is a great step forward.

The matter of the constitution of the profession has certainly been well ventilated, and those of our readers who are interested should get a copy of the Parliamentary Debate which took place on the 11th inst.*

The Bill asks for no further powers, and the matter of taxing ourselves is quite our own affair. Without money we can do nothing, and in this we do not differ from other Corporate Bodies. There is no profession which has been more self-supporting than ours—too much so, perhaps, in the past. As Captain Elliott, M.P., stated in the House: "In this measure the Veterinary Surgeons are asking permission to tax themselves, and the fact that they are willing to do this in order to extend and enlarge the field of knowledge on these matters is one of the most admirable elements of public spirit that this House has recently seen." The Parliamentary Secretary of the Ministry of Agriculture (Sir A. Boscawen, M.P.) gave it his emphatic blessing in the words, when speaking on the subject of the Bill, "not only have we no objection to it, but we very much hope it will pass into law"; whilst the lucid explanations of several dis-

* Obtained from H.M. Stationery Office, Imperial House, Kingsway, London, W.C.2. Price 3d.

puted points by Mr. Cautley, M.P., would almost entitle one to think that his name was already on the Register of the Royal College of Veterinary Surgeons, so perfect was his knowledge and so accurate his description of the academic status of the teaching and the examining bodies. The profession is grateful to the Members of the House of Commons who have given the Bill their support, whether actively or only by their votes, for to our future the success of the Bill means a lot, but to the Agricultural Community it means much more.

THE TREATMENT OF MAMMITIS IN COWS.

THE treatment of inflammatory diseases of the udder which affect the composition and secretion of milk has long been in an unsatisfactory condition. External applications, fomentations and febrifuges have little effect in remedying a diseased or defective condition arising in connection with the physiological action of milk secretion or to some pathological condition inside the udder itself. A good deal of investigation has apparently been carried out with a view to ascertaining what medicinal remedies given by the mouth appear in the milk when drawn from the udder. We know for instance that iodine, salts of lead and copper, aloes, senna, rhubarb, croton, boracic and salicylic acid, etc., when given are eliminated in some degree by the milk and chloroform and ether may be found in it after anæsthesia. The object of these investigations chiefly appears to have been to draw up a list of drugs that veterinary surgeons should not give to milch cows when treating their diseases.

Until quite recently it never seems to have struck anybody that the very fact that medicinal agents given may be secreted in the milk is an important therapeutical fact to be made use of in the treatment of diseases of the udder, bringing about bad milk. In a recent number of *The Journal of the American Veterinary Medical Association*, Professor J. N. Frost, Cornell University Veterinary School, U.S.A., gives an interesting and practical account of the uses of formalin (liquor formaldehydi) in the treatment of 5 cases of mastitis. His article was reproduced on pages 115, 116, 117, 118 of *THE VETERINARY JOURNAL* for March, 1920, and will well repay perusal by all veterinary surgeons interested in the subject. Most of us know the good effect of a constant stream of a suitable antiseptic on an unhealthy wound or dirty abscess cavity, and where the same effect can be produced in a living gland which is naturally endeavouring to throw off and eliminate a diseased secretion the use of the antiseptic stream seems to be very sound theoretically. Practically, too, we think Professor Frost has done good service and we hope that our readers, and especially country practitioners, will give us their experiences in the use of forma-

lin in the treatment of mammitis. Most of the cases we have to treat (apart from tuberculosis) are those of streptococcic mammitis. The milk is discoloured with the blood, or is yellow, and has yellow or yellowish brown flakes in it suspended in a watery fluid (serum or plasma), or when allowed to stand for several hours a white, yellowish white or yellowish sediment settles to the bottom, or the milk may be grayish and watery.

On May 20 we were called to see a black and white cross-bred cow, 8 years old, suffering from mammitis in both fore quarters of the udder. The milk was reddish-brown, flocculent and smelt badly. We prescribed $\frac{1}{2}$ ounce doses of formalin night and morning in a full quart of cold water. At the same time the bag was rubbed with an emollient liniment (rape oil, water, pot. carb. and liquor plumbi. subacet.). After 8 days' treatment, the owner reported the cow milking well and normally. The only precaution that seemed necessary was to impress on the attendant the importance of giving the drug in a *full quart* of water, and in order that no mistake could be made we supplied him with a quart bottle.

In one or two of Professor Frost's cases $\frac{1}{2}$ ounce doses of formalin were followed by one drachm doses 3 times daily. In order to produce the good effect of the formalin treatment it does not seem necessary to give one ounce doses of the drug twice daily, as recommended on page 118 of the *V.J.*, March, 1920. Economy in drugs is important at present, and when a cow has been on grass, a preliminary dose of salts is not necessary. We think that formalin might be used to remedy defects in milk (of colour and taste) not due to mammitis.

Original Communications.

A CASE SHOWING THE IMPORTANCE OF THOROUGH DISINFECTION.

By W. T. HEWETSON, M.R.C.V.S.,
Brampton, Cumberland.

IN November last I was asked to accompany Mr. Barrow, M.R.C.V.S., Ireby, Cumberland, to see some cattle about a year old, which were affected with head trouble. In the first instance, the owner noticed that one of his cattle did not seem quite well. He did not consider it ailed much, but it looked somewhat stupid, and did not appear to be grazing like the rest. So he decided to drive it home. The animal seemed to be ailing so little when driven that the owner almost changed his mind, but he remembered that cattle ailing on grass were often worse than they appeared to be. So the animal was driven home, and a dose of laxative medicine administered. The next morning it was found lying on its side and unable to rise,

at times struggling and fighting with all four legs. It appeared to be in such a hopeless condition that it was decided to put it out of pain. This was done by striking it a blow on the head. The following day two more cattle were found to be ailing in a similar way. Mr. Barrow was called in, and as the first case was not buried, he made a post-mortem, and found the remains of a burst cyst on the brain, yet there were no distinct symptoms of sturdy in the two other cattle ailing. They did not turn round, nor could any softening of the frontal bones be felt on manipulation. One animal, when inside, kept boring his head against the wall, and when outside he would rush through the fences. The other only appeared dull and stupid. The breathing was not affected unless the animals were excited. The appetite, though impaired, was not quite lost.

When I visited the farm with Mr. Barrow, there were four cattle ailing. One carried its head in the normal position, but persisted in walking from one end of the shed to the other, and this it continued to do for a number of times. One animal held its head slightly to one side, and appeared to be partially blind in one eye. Another was only slightly affected in the head. The fourth animal was lying on its side, unable to rise, and occasionally struggling as if in pain. From these symptoms we concluded that the animals were suffering from sturdy, or otherwise they were suffering from the effects of a poison generated in the digestive organs, probably from eating fallen leaves. It is not unusual to have three or four animals affected at the same time, on the same farm, and showing symptoms of stomach staggers, as it is commonly called, but it is very unusual to have five cattle at the same place and at the same time suffering from sturdy.

The owner had bred and reared nineteen calves during the previous autumn and early spring. All the calves had been reared under the same conditions, and all had been free from disease of any kind up to the present. After hearing what the owner had to say, we came to the conclusion that the animals were suffering from stomach trouble. As one of the steers was unable to rise, and had not taken any food for a day or two, we obtained consent to kill it and make a post-mortem. So the animal was bled. The internal organs and bowel contents were carefully examined. All the internal organs were healthy, nor could we find anything in the appearance or in the contents of the stomachs and bowels that could cause the symptoms manifest. The brain alone remained to be examined. We carefully removed the frontal part of the skull, and lying on the front of the brain we found a large cyst (*cœnurus cerebrealis*), thus proving we had made a wrong diagnosis. Instead of killing the animal, it would have been better if we had operated for sturdy first, and in this case from the position of the cyst, I am sure we would have punctured it,

and the animal might have been saved. In explaining to the owner that the cause of sturdiness was due to cattle swallowing segments of the tape-worm passed by the dog, we learned that all these calves had been reared in a stable which was not used for horses, but during the summer months five dogs were kept in it. The calves were put in this stable at birth, but the place had been previously cleaned and disinfected with lime and dipping, we were told. The owner, on being asked if all the woodwork had been cleaned and disinfected, replied that only the walls and floors had been. Seeing the three ailing cattle were in very good condition, it was thought advisable to send them to the slaughter-house to be slaughtered. Of the nineteen steers that were thus reared, eight of them became affected with sturdiness.

CUCUMIS MYRIOCARPUS (WILD MELON VINE) AS A
CAUSE OF IMPACTION OF THE COLON IN NEW SOUTH
WALES.

By MAX HENRY, B.V.Sc., M.R.C.V.S.,

Sydney, New South Wales.

AND H. BELSCHNER

(Third Year Student, Sydney University Veterinary School).

THERE grows very plentifully throughout the greater part of the western districts of New South Wales a member of the family *Cucurbitaceæ*, introduced originally from South Africa, and known locally as the wild or paddy melon. It has been identified by the Government Botanist, Mr. J. H. Maiden, F.L.S., as *Cucumis myriocarpus* (Naud.).

The plant grows much like any melon or pumpkin vine, sending out long trailing stems, bearing small yellow flowers, and then numerous small melons about three-quarters to one inch in diameter—much like a miniature water melon in appearance, but prickly. They are at first greenish, but turn yellow as they ripen, and are much appreciated by stock in dry times for the moisture they contain. The melons themselves have frequently been accused of causing amaurosis from degeneration of the optic nerve in horses, but so far experimental work has failed to substantiate this.

The plant has very considerable drought-resisting powers, and is frequently the only green thing to be seen in the paddocks. While young it is fairly succulent and comparatively harmless, but when old and commencing to die off the long trailing stems and the leaf stalks are extremely fibrous, and show a very marked tendency to ball in the stomach and intestines, especially when melon forms the greater part or almost all the diet of the animals. Frequent reports have been received of horses dying from eating melon, and in some instances the post-mortem appearances described pointed to impaction of the colon as the cause of death.

Although cursed by horse-owners, the plant is not without its supporters, as during drouthy periods, such as are now being experienced, it provides excellent feed for sheep and cattle, which do not appear to suffer from its effects owing, probably, to the remastication. It has, on at least one occasion, been made into silage and fed later with success.

Recently opportunity was afforded the writers of observing several cases where the cause and course of the affection could be clearly followed, and curative treatment adopted. The animals affected were young well-bred draught mares in very fair condition, who were at the time in a paddock containing a large quantity of melon, although they had only recently been brought in. The paddock in which they had previously been running had contained some melon, but not a great quantity. The writers are thus unable altogether to agree with Stock Inspector Little, who, writing in the *Agricultural Gazette* of New South Wales for August, 1915, states that "horses running constantly on melon seldom suffer, when they do it is generally the old animals or those with defective teeth."

There had been on the farm in question rather heavy mortality, which so far had not been satisfactorily explained, and as the country had once had a bad reputation for anthrax, the solution of the question was of some importance. The first case seen was as follows :—

The mare was turned into the melon paddock on Sunday morning, and was then apparently in good health. She was not again seen until midday on Monday, when she was found dead, although the carcass was still warm. There was no discharge from the natural orifices, nor was the body excessively distended with gas. No injury or wound was noticed, except a small fistula of the wither. The subcutaneous tissues were normal, but the blood had not coagulated well and was dark in colour and somewhat sticky. The stomach was filled with water, and was normal save for two spiropteral tumours, each about one inch in diameter. The small intestine was almost empty, and was patchily congested—caecum normal—large colon very full of a mass of fibrous material mostly composed of the remains of the paddy melon ; a few inches from ileo-caecal valve was a hard, rounded mass about nine by six inches of the same material. The small colon contained, about a foot from its commencement, a larger mass, very firm, and taking the impress of the colon. Where these masses occurred the intestine was markedly congested. Strongyles were present in fair numbers. There were signs of struggling visible on the ground. The feed in the paddock contained a great deal of melon, and the mare had evidently done her best to fill herself with it, both in this and in her last paddock. It is often said, and with some justification, that

certain animals develop a liking for the plant to a greater extent than others, and will even leave fair feed to eat them.

Although the cause of death was fairly obvious, yet, owing to the previous history of the place, it was thought as well to submit smears and an ear to the Veterinary Pathologist (Dr. S. Dodd, D.V.Sc., M.R.C.V.S.), who reported that no pathogenic organisms were present. A few days later a second* animal was found dead, and on post-mortem examination revealed a practically identical picture. Whilst the post-mortem on this animal was being carried out it was noticed that two more animals were down and in pain. They were immediately removed to the stables and drenched with Ol. lini, 1 pint, Ol. menth Pip, 1 drin., Spts. Ammon. arom, 1 oz. After backraking, copious enemata of cold water were administered with the garden hose, and as a result in one case a hard, elongated mass of vine, weighing 3½ lbs., was passed, and almost immediate relief given to the animal.

In the other case relief had not occurred that night, so 1 oz. Chloral was given, and next morning a further half pint Ol. lini and copious enemata. As a result, two large masses similar to that removed from the previous case were passed. Both animals then made an uninterrupted recovery, and the remainder of the horses were removed from the paddock.

The cases are of interest not from the point of view of treatment, which merely follows routine lines, but because one particular article of food can be with certainty accused of being the direct cause of the impaction and mortality, and such knowledge is of considerable value to veterinarians called on to investigate mortality from unexplained causes in the back country of Australia.

A NOTE ON A TYPE OF MARASMUS AMONGST HORSES IN INDIA.

By CAPT. J. R. HODGKINS, D.S.O., F.R.C.V.S.,
ROYAL ARMY VETERINARY CORPS.
(Secunderabad, India).

THERE exists in India a disease of horses which causes chronic debility and emaciation. As the result of careful post-mortem examinations and the elimination of other probable causes by blood examinations, malleinisation, etc., one is forced to the conclusion that the debility is the result of chronic gastritis.

The factors causing the gastritis are nematode worms, *spiropteres*, or, as they are more correctly designated, *habronemæ*. There are three *habronemæ* found in the stomachs of equines, viz.:

- Habronema megastoma* (Rulodphi).
- „ *microstoma* (Schneider).
- „ *muscæ* (Carter).

The first of these nematodes is found in sub-mucous abscesses in the stomach of equines, while the other two species are found lying free on the mucous surface of the stomach.

The life histories of all these parasites have been worked out, the first being the work of Ransom on *H. Muscæ*. Working on the same lines Hill has worked on the cycle of the other two species.

It may be stated briefly that according to Ransom the life cycle of *H. muscæ* is completed in the common house-fly, *Musca domestica*, and that Hill found that the life cycle of *H. megastoma* was also completed in *Musca domestica*, whilst that of *H. microstoma* had for its intermediate host *Stomoxys calcitrans*.

The prevention of infestation by these nematodes depends on the destruction of flies.

Fly breeding takes place in freshly-deposited horse manure, so that early removal of this material from the vicinity of lines is indicated.

The spraying of dung pits is essential. *H. megastoma* is inaccessible to medication by way of the mouth.

H. microstoma and *H. muscæ* lie in the " glue-like " layer of mucous on the villous portion of the stomach.

At post-mortem examination the two nematodes that live superficially are seen to be moving in myriads on the internal lining of the stomach and they are not easily removed. Merely washing the surface will not dislodge them, they require to be scraped away. This, of course, is because of the thick tenacious mucous in which they live.

The disease apparently does not yield to treatment by way of the mouth, and intra-venous infections of tartar emetic have had no effect on cases under observation.

The damage done by these parasites is very considerable, as the following accounts of post-mortem examinations will show.

CASE I.—*Subject* : Bay gelding, age 7 8/12 ; Australian.

History : Admitted with lymphangitis, very debilitated. Usual treatment for lymphangitis.

Malleined—negative.

Blood smears—negative.

The lymphangitis quickly cleared up, but no treatment improved the debility.

He was destroyed.

Post-mortem Examination.—Carcase was very poor in fat. There was a sub-mucous abscess in the stomach as large as a coconut.

The cardiac mucosa was chronically inflamed and thickened. The abscess contained a cheesy stinking mass of inspissated pus and nests of *H. megastoma*. The pylorus was covered with nematodes.

CASE 2.—Bay gelding, thirteen years, Australian ; admitted with debility. Has entries for debility ;

1916 = 30 days.

1917 = 72 „

1918 = 9 „

1919 = 40 „

151 days.

Destroyed 11—19.

Post-mortem Examination.—Carcase deficient in fat. There was a sub-mucous abscess as large as an orange. The stinking pus of the interior was alive with *H. megastoma*.

CASE 3.—Bay mare, aged 8 ; Australian.

History : Diarrhoea on 9-11-19, very debilitated, grew worse and became emaciated. Went off feed and was so weak on 22-11-19, that she was destroyed.

Post-mortem Examination.—Carcase emaciated ; stomach the subject of a chronic gastritis. Many sub-mucous abscesses containing *H. megastoma*. Local peritonitis was present above the area of attachment of spleen. Spleen very enlarged and undergoing a generalised suppurative inflammation. Abscesses in the mesenteric glands.

CASES 4, 5 and 6.—Were all debilitated 95 days, 50 days, 73 days, under treatment respectively. Malleined and blood smears taken with negative results.

Post-mortem Examination showed chronic gastritis, the presence of submucous abscesses with nematode worms and stinking pus. The *habronemæ* on the inner surface of the stomach seemed to exist in myriads. All other organs were apparently normal.

CASE 7.—Bay mare, 9 years ; under treatment for debility, 66 days. Mallein test and blood tests negative. Destroyed.

Post-mortem Examination.—Chronic gastritis ; a large flat abscess with fibrous walls, 5" × 4", containing pus smelling foully and an orange-sized abscess were present in the sub-mucosa. Vast numbers of *habronemæ* on the mucous surface of the stomach. Carcase poor. Organs, other than the stomach, normal.

CASE 8.—Bay mare, 10 years. Under treatment 85 days with debility.

Post-mortem findings exactly as in previous case.

CASE 9.—Bay Australian gelding, aged 9 ; came into hospital on 1st of month with colic. He was debilitated. He was treated for colic and appeared well on the 3rd. On the 13th he was again colicky, very anæmic and depressed, with sunken eyes and totally off his feed. He died on the 14th.

Post-mortem Examination.—On opening the carcase a large quantity of pus was found lying in the abdominal cavity. There was an extensive inflammation of the peritoneum. At the apex of the spleen was an evacuated abscess cavity. On opening the stomach a large sub-mucous abscess corresponding in position with the abscess situated on the external surface and involving the spleen was found. This abscess was due to *H. megastoma*. A second sub-mucous abscess was present.

The surface of these abscesses as the result of gastritis is best likened to an uterine cotyledon of a cow. There was an extensive chronic gastritis and *habronemæ* were present on the mucous surface.

The abscess in the splenic area (and the subsequent peritonitis) was probably due to bacterial invasion from the suppurative processes in the gastric mucosa. Compare Case No. 3 with this one.

CASE 10.—An eight-year old Australian gelding came under notice in October, 1919, very debilitated, malleined and blood smears examined. Negative results in both tests. He had a dental irregularity that was easily corrected.

A course of treatment for debility and internal parasites was followed out for two months. At the end of this period he had not made the slightest progress. He was kept under observation until March 20 and then destroyed.

Post-mortem Examination.—The stomach was the subject of chronic gastritis. There was a patch of ulceration $3" \times 2\frac{1}{2}"$ situated in the pyloras. The pyloric extremity of the stomach was very much thickened and hard to the touch. One sub-mucous abscess was present, containing *H. megastoma*. There were vast numbers of *habronemæ* in the mucous surface. A very careful examination revealed no further abnormalities.

A CONTAGIOUS IMPETIGO OF CATTLE.

By H. E. HORNBY, M.R.C.V.S., D.V.S.

(Northern Rhodesia.)

Next to trypanosomiasis, skin-diseases are the chief sources of loss to European cattle-owners in the Fort Jameson district of Northern Rhodesia. The worst of these is demodectic mange, but running it close for destructiveness is the subject of this article. Other forms of skin-disease affecting cattle of Northern Rhodesia are psoroptic mange, eczema and a dermatitis of white-skinned animals which is probably due to the action of strong sunlight on sensitised, unpigmented skin.

The greater part of my knowledge of the etiology of this contagious impetigo is founded on an authoritative article by R. van Saceghem

(1915). What is apparently the same disease has been alluded to by Armfield (1916), Curson (1919) and Hutchins (1919). My chief, Mr. Lane, dealt with it in a circular letter in 1915.

Distribution.—The disease occurs throughout Central Africa. Lane records its presence in N.W. Rhodesia under the name of "Senkobo Skin-Disease." Curson speaks of it under its local native name of "Saria," as occurring in the New Langenburg district of Tanganyika Concession. My friend, Mr. F. J. McCall, tells me that it exists in British East Africa, and I have it in on the authority of Dr. Van Raes, of Elizabethville, that it exists in Egypt as well as in the Congo. Hutchins records the infection of a dairy herd in Kampala, Uganda, by a streptothrix, and he describes symptoms and lesions which make me think that he refers to this disease. I have met with cases in Northern Rhodesia, Nyasaland, Portuguese East Africa and Tanganyika Concession (formerly German East Africa). Its distribution recalls that of demodectic mange, for, like that disease, it is apparently unknown to stock-owners south of the Zambesi.

Animals Affected.—Lane has known an eland to contract the disease, and I remember seeing lesions on a horse's legs and sheath which strongly resembled those of contagious impetigo; nevertheless, it is only as a cattle disease that the condition is well-known. It is enzootic throughout Central Africa, and one often sees native cattle slightly affected. European cattle and their grade progeny are far more susceptible to the disease than are native cattle, and among them the disease may assume epizootic form. Animals of all ages are attacked, and fat ones are as readily affected as thin.

Symptoms and Lesions.—The disease is essentially a seasonal one. It is from the commencement of the rainy season that fresh cases become apparent, for after the termination of the rains the disease assumes a chronic form in survivors, and fresh cases do not occur. The lesions may occur on any part of the body, but as a rule they are first noticed on the back, and in the beginning they consist of nothing more than "paintbrushes" formed by the matting together of a few hairs. Later on one notices little elevations on the skin and, as the disease advances, these grow and become confluent until they form bare, wart-like scabs through which stick a few hairs. Scraping or traction easily raises such a scab, which is then seen to be a crust composed of hairs, epidermal cells and coagulated exudate, leaving exposed a moist, pinkish surface, slightly hirsute and which may bleed a little. Very rarely is there an appreciable amount of pus formed. The lesions may be confined to the back of an animal and, in a native beast, may remain inconsiderable or even disappear spontaneously; that is, native cattle are essentially immune to the

disease. If the disease makes its appearance on a susceptible animal immediately before the cessation of the rains it, too, may remain in the form of localised lesions, but such a susceptible subject would



FIG. 1.—Generalised Contagious Impetigo, as seen during the dry season.

allow the disease to progress very rapidly under the favourable conditions of the rainy season. Commencing on the back the lesions would spread to the sides, perinaeum, axillae, udder or scrotum, belly, thighs, shanks, neck and head, in more or less the order mentioned. As the disease progresses the formerly discrete patches become confluent. Although the animal may be fat at the commencement, it always loses condition as the disease becomes generalised, and eventually it dies in marasmus.

Lane, in his description of the disease, says that the lesions may take two forms; one similar to those described above; the other characterised by small lumps *under* the skin, followed later by the wart-like growths. I think it probable that these latter cases are ones of mixed infection by the impetigo parasite and demodectic acari, a matter of frequent occurrence.

Van Saceghem considers that from the clinical point of view the disease may be localised or generalised. In the case of non-generalisation the malady may be limited to small lesions which may pass unnoticed but yet suffice to perpetuate the disease in a herd.

Etiology.—I have not had time to study this carefully, but very early in my researches a large series of negative findings, when fresh or macerated crusts and scrapings were examined in an unstained condition, convinced me that the disease was not an acariasis. Shortly

afterwards I became aware of van Saceghem's researches and I have not had difficulty in finding the parasite in stained preparations.

Both Lane and Armfield make tentative suggestions that the disease may be due to a virus carried by bont ticks, and the former, moreover, suggests that streptococci may be the causal organisms. It is probable that what Lane thought were streptococci were really spores of the causal fungus. The theory that bont ticks account for the spread of the disease is difficult to reconcile with the relative positions occupied on the body by these ticks and many of the lesions, unless one postulates, as does Armfield, that the arthropods introduce the virus into the blood.

F. J. McCall told me that he had found a streptothrix to be constantly present in the lesions, and Hutchins blames a parasite of the same nature. I am not in a position to state whether the organism constantly associated with the lesions can be correctly described as a "streptothrix," but the researches of van Saceghem seem to point conclusively to its fungoid nature.

The specific fungus is not detectable in the fresh state ; it is necessary to make a stained preparation and to examine it with an immersion

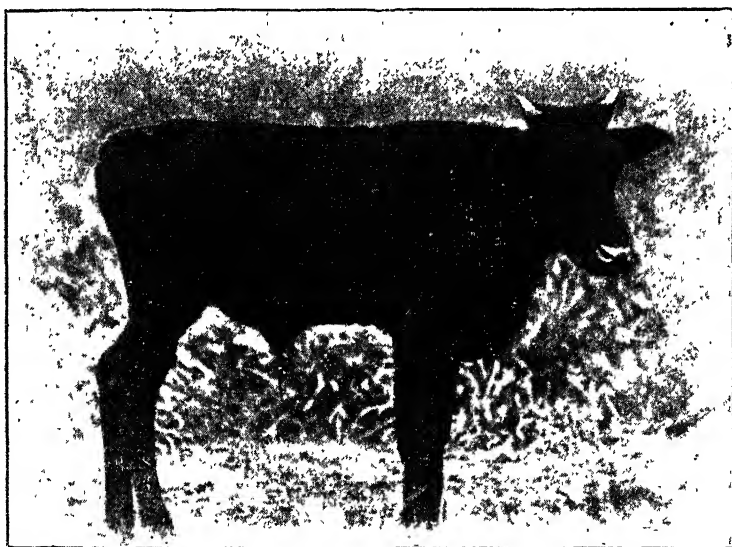


FIG. 2.—Generalised Contagious Impetigo, as seen during the wet season.

lens. One can make a smear with the serous exudate that is found under the crusts, or, more simply, one can make a microscopical preparation from crusts that have been teased up after a few minutes'

immersion in physiological serum. The stains recommended are dilute fuchsin, methylene blue, gentian violet, Borrel blue and Giemsa. For a description of the parasite I will quote the Belgian authority's own words :—

“ On observe des filaments mycéliens plus ou moins abondants, parfois contournés, rarement ramifiés, irrégulièrement segmentés, entourés d'une membrane non colorée. Ces filaments ont une épaisseur de 1.4m à 1.8m et une longueur qui peut atteindre 1 mm. Ces filaments sont bourrés de spores rangées verticalement suivant la longueur, par trois, par quatre ou en amas. Dans la préparation, on observe parfois des amas de spores isolées qui simulent des cocci. La spore unique se multiplie et donne naissance à une rangée de spores qui se divisent pendant quelque temps dans le même sens ; à un moment donné, les spores se divisent dans les deux sens, d'abord une fois, puis deux fois.”

The author just quoted claims to have established that the parasite he describes is the true cause of the disease, and he named it *dermatophilus congolensis*. The fungus does not grow deeply into the skin, and, in the crusts, the hair is never attacked.

Why the disease only assumes a grave character during the rains is because it is only at this period of the year that the fungus finds the conditions of humidity and warmth necessary for its growth. Its greater exposure to rain and dew make the back a predilection seat of the parasite. Sucking calves frequently develop lesions around those parts of the muzzle which are regularly moistened with milk.

The spread of the disease over the body is determined by the existence of the necessary moisture, which may be derived from rain and dew, or may be in the form of serum compressed from clots due to injuries of any nature. It is probably owing to tick-bites that the axillae and perinaeum are so frequently affected. Other causes of spread of the disease over the body are rubbing, contaminated litter, tail-switching, defaecation, urination, etc.

Propagation from beast to beast takes place through the medium of infected rubbing places, contaminated litter or trek-gear. Possibly, also, through the agency of whips and flies.

Diagnosis.—After very little experience the disease can be recognised by simple inspection, because the scab formation is very characteristic if not actually pathognomonic. To demonstrate the parasite I pull off a crust and, with a clean knife, scrape the exposed raw surface. With the sanguinous matter so collected I make a somewhat thick smear. After fixation by heat I stain the preparation with alkaline methylene blue. It is on the thicker parts of the pre-

paration that one finds masses of the parasite ; among the scattered cells of the thin parts one finds only small pieces of broken mycelium. What is seen corresponds closely with what I have described above, the only point on which I am at issue with van Saceghem is in connection with the thickness being not greater than 1.8m. I have not been able to measure them but some filaments certainly appear to be bigger than that. Extraneous bacteria are surprisingly rare in these smears.

Prophylaxis.—This is deduced easily from a knowledge of the etiology. It is very difficult to guard against the introduction of the disease, on account of the impossibility of detecting minute lesions on an immune beast. Any visibly affected animal should be isolated and a policy of perfection would not allow a return to the herd of a cured beast. Regular dipping in arsenical fluid is claimed by some to act as a preventive, but a number of Southern Rhodesian oxen brought to Fort Jameson last year contracted the disease through intermediate infection, in spite of regular fortnightly dippings in full strength arsenical fluid.

Treatment.—Lane claims that regular dipping in full-strength Cooper's dip will cure mild cases. For more advanced cases he recommends a lime and sulphur bath. Van Saceghem lays emphasis, on the fact that if possible treated animals should be kept *dry*. In his opinion the lesions should not be washed or subjected to friction, as he considers that these manipulations only irritate the skin and serve to spread the lesions. He states that he caused generalisation of previously localised lesions by friction with arsenite of soda solution. He recommends cauterising local lesions with fire, after carefully picking off the crusts. His best results in the treatment of generalised cases followed the application without friction of carbolised pomade (1-10), dressing only a quarter of the body surface at one time.

M. Piot Bey recommends washing with soap, raising the crusts and then painting the affected surface with a 1 per cent. picric acid solution.

My own experience of arsenical dip as a curative agent has not been happy, nor was I very successful with a dressing of paraffin, sulphur and lard. I agree with van Saceghem that a therapeutic agent which fails to kill the parasite may serve to spread the disease. What he did with sodium arsenite solution I did with a weak carbolic one. It is useless to attempt to cure the disease with disinfectants of ordinary wound-lotion strength ; for instance, mercury perchloride is only useful when employed in the strength of 1-200.

I use Cooper's milk oil fluid, *not weaker than 1-30*. Correspondingly strong emulsions of similar proprietary drugs, as Hycol, Izal, Jeye's fluid, etc., are likewise useful. When treating a solitary lesion, I pick off the crust and apply the undiluted milk oil fluid. When lesions are localised I use it in the strength of 1-10 or 1-20. When the disease is generalised so that the whole body must be dressed I use it in the strength of 1-30, but I dress only from a quarter to half of a beast's body at one time, according to the extent of raw surface exposed by removing the scabs. By this means all but the worst cases can be cured, especially if, a fortnight after the first dressing, all unhealed lesions receive a second and stronger application of the medicament.

CASTRATION OF BOVINE MALES.

By D. S. LAUD, G.B.V.C.,
Veterinary Inspector, Municipal Health Department, Bombay.

UNDER the heading of "Castration of Bovine Males," I read an article in the VETERINARY JOURNAL of November, 1919, and it prompts me to record cases of castration, and the method adopted in case of three municipal bulls of Health Department Stables, C. Ward, Bombay Municipality, that were getting very mischievous, and the scavengering cart drivers could not control them.

Case No. 1.—Horn No. 11, Brand No. 1919, colour white; height 12-2", "Khillari Breed," age 5 years.

Case No. 2.—Horn No. 12, Brand No. 1919, colour white; height 12-2", "Khillari Breed," age 6 years (pair of the first).

Case No. 3.—Horn No. 5, Brand No. 1919; colour white; height 12-2½", "Deccani Breed," age 6 years.

The animals were prepared the previous day and were castrated on January 26, 1920. Castration clamps, scissors, and knife were placed in a bucket containing antiseptic solution of Zondo-fluid 1 in 500, for half-an-hour prior to the operation. The animals, after being cast, the parts and the surrounding portions were washed with soap and water, and well disinfected with solution of Zondo-fluid 1 in 1,000.

Technic.—A tape previously placed in Zondo-fluid solution 1 in 1,000 was tied round the scrotum, high up, near the external inguinal ring, to prevent retraction of the testes. In Cases No. 1 and No. 2, incisions were made on each scrotal sac parallel to the median raphe, and the testes and the cords were exposed and dissected, the membranes covering being slowly torn with fingers, taking care not to injure the vessels. Clamps were put on, and the cords severed by means of hot irons. It may be mentioned that clamping and severing

of both the cords in Case No. 2 were done at one and the same time, but in Case No. 1 each testis was taken separately.

Case No. 3.—The incision in this case was made on the median raphe, and both the testes were exposed, and the operation completed as in Case No. 2.

The wounds were well washed with solution of Zondo-fluid, 1 in 1,000, and plugged with aseptic cotton wool, wrung out of the same solution, and the adjoining portions anointed with carbolized vaseline, 1 in 16.

No dressing done on the second day, but on the third day the swelling was fomented with hot water containing "Neem leaves" (*Azadirachta Indica*), and these fomentations were continued for about a week. The wounds were daily washed with Zondo-fluid solution 1 in 1,000, injected with aqueous solution of iodine, and plugged with cotton wool soaked in iodine solution for first six days, and subsequently with the dressing oil :—

Re

Creasoti	ʒii
Acid Carbolic ..	ʒiv
Ol. Terebenthin ..	ʒi
Sweet oil	Oi
Misce Fiat Applicatio.	

Case No. 1 was discharged cured in three weeks, but the other two cases took ten days more, as both the animals struggled at the time of the operation, and there was some straining on the cords. The wounds had also to be scraped twice on account of slight induration.

The animals were given clean bedding of hay every day, and were allowed certain quantity of lucerne, and were exercised for half-an-hour in the stable daily. For the first four days they were put on bran only, with 15 lbs. of hay; after this, they were given 5 lbs. of gram crushed and soaked, $\frac{1}{2}$ lb. of bran, and 15 lbs. of hay, and $\frac{1}{4}$ oz. of salt.

My colleagues in the Department and I have had a number of other cases for castration, in which animals were not prepared for the operation the previous day; operation done by the methods described above, and after-treatment consisted of washing the wounds with Zondo-fluid solution, injection of iodine solution, and dressing with carbolic oil 1 in 20. Cure effected in from four to five weeks. No stiffness as the result of wound infection, nor any untoward effects have occurred in any of the cases. We always cast the animal for castration.

INTERESTING NOTES FROM VENEZUELA.

By E. MORGAN, M.R.C.V.S., D.V.H.

(Puerlo Cabello).

READING the "Interesting Cattle Cases" of Mr. I. R. Rigby, M.R.C.V.S., in THE VETERINARY JOURNAL for last December, has been the cause of recalling to me several cases which resembled them—in many respects; these occurred in my practice in Cardiganshire in the late spring of the year 1913. All the animals I attended were either white or contained a certain amount of white-coloured hair on the body. There was one particular difference between our cases, inasmuch as all mine were animals under two years old. The age, time of the year and many of the symptoms made me think at first that it was an outbreak of Black Quasher. But in these cases the skin was as hard as a board and absence of the crepitating noise. Eventually, in most of the cases, the skin commenced to slough at certain areas, and they appeared then a worse sight than before, although I found that this was the only hope of recovery, as the few which remained hard in spite of scarification, fomentation, setoning and in few cases I even injected turpentine subcutaneously, yet death supervened in about a fortnight after the first symptoms of the disease; all the fatal cases were white throughout, *i.e.*, entire skin and hair. These cases were in some instances long distances from one another, in scattered practice. At one farm the majority of the yearling cattle had the disease; at other farms perhaps one or two cases amongst the herd. They were all out on pasture at the time. I need not dwell longer on these particular cases as the treatment in the medicinal line was more or less similar to the one mentioned by Mr. Rigby, only that in one case—a 2-year old white heifer, in extra good condition, which prolonged more than any of the other cases—I tried pot. iodide, but without results, as the case eventually died with extensive hard swellings on the body. The cause of this disease has always remained a mystery to me.

There is a peculiar skin disease of cattle in Venezuela which is called in Spanish "Arestin," which is an excoriation or cutaneous eruption. All the cases I have noticed were fully grown cattle. It only affects white or lightish coloured areas. It never happens in black cattle. In black and white cattle it is most pronounced at times, inasmuch as the white areas are diseased and the black areas quite healthy. It forms a kind of scab along the back and is most prominent above the loins and hind-quarters. It appears as if earth has been spread along the back. They eventually form hard callosities similar in consistence to the horny chesnuts on horses' limbs. They sometimes form fairly large protuberances and when these are irritated, as is often

the case when a herd of bullocks are together, and one mounts the other, then the surfaces of these bleed, with the result of flies blowing on them and maggots are formed. It seems to be confined to the superficial layers of the skin. I often examine these cattle and their carcasses afterwards at the abattoir. It causes a great deal of inconvenience and pain to the animal at times. When it is extensive along the back, these cattle are generally in a lower condition than the rest. Again it deteriorates the hide to a certain extent, although it does not penetrate through, but sometimes these areas are prominent when salt-cured hides are taken out of the pack for exportation, after remaining in the salt for at least one month.

I have made enquiries from many of the cattle breeders in Venezuela and they are all agreed that it is only met in white or nearly white-coloured areas on the skin. Also the majority seem to agree that the heat of the sun has something to do with its formation. I have only met these cases in cattle which are pastured in the open with very little shade, and also in working oxen, which are most of the time working in the open without any protection against the piercing rays of the sun. Whether mosquitoes and other flies alight and irritate these light-coloured areas and then the strong rays of the sun follows and aggravates matters is difficult to solve, but it is quite feasible. Again, why are the backs or upper part of the body, in most cases, only affected? Possibly these are the areas least protected against flies and the rays of the sun. On account of their greater power of resistance to this as well as other diseases, some breeders on the plains endeavour to breed black cattle by allowing only black bulls with their herds. Also some keen observers of such matters as these only train dark-coloured animals as working oxen on account of these complaints.

In this country and Columbia there is a mosquito "*Janthinosoma Luizi*," which is a carrier of the eggs of a fly called "*Dermatobia Cyanwensis*" (Macquart, 1843). They deposit the eggs on the skin of cattle of all ages, but more often they attack cattle with white hair and white skin. The larvæ (or, as it is called here—*nuche*) is said to enter the skin, the adhesive portion is beset with hooklets and has two strong oval hooks. The posterior end carries the stigmata. If left to themselves the larvæ will remain in the skin for some time and finally escape to drop on the ground and form pupæ and imagos. In size and character they, in many respects, resemble the "*hypoderma bovis*," but in the majority of cases are found behind the elbow where the hair is fine, also between the hind-quarters above the scrotum and sometimes in the neck region. They cause trouble and the animals sometimes, if not attended to, waste into mere skeletons, as these areas often

bleed due to their presence, and form an extensive deep lesion often several inches wide. They seem to develop quickly to a large size, *i.e.*, the larvæ, as I have noticed them in young calves, so they complete their life-cycle much quicker than the hypoderma bovis in Great Britain.

There is a race of cattle in Columbia called "Ganado Antioqueño," with black points, white hair and black skin; these are almost, if not absolutely, free of these larvæ of Dermatobia, although they are white, except at the extremities, but the skin is black.

Cattle breeders inform me that even bats molest white more often than black stock. The reason for this is, I think, not on account of the character of the skin, but as the bat glides through the air at night, and obviously white animals, amongst a mob are more visible than darker ones, so he comes against his victim sooner, should it happen to be while on a dark night. Bats cause heavy losses in calves and foals in this country by sucking their blood. Even pigs and fowls are not exempted. I have noticed horses even too weak to walk on account of bats draining their blood every night. Young animals are unable to resist so well as older ones, so they die very soon from deficiency of blood. A breeder of pure-bred imported pigs had to dispose, the other week, of his whole lot of sows on account of the bats. They had eaten all their teats, both young and old alike. Many of these sows farrowed, but the young pigs naturally died as there was no means of getting milk. One has to be careful while buying breeding sows here to examine each gland, as they appear to be present, especially in old sows, on account of the size of the gland, but the teats are missing very often.

It is most interesting the way this little flying, bloodthirsty mammal taps the blood vessels in fowls. They bleed them through the aural orifice, possibly this being due to the feathers interfering with their beaks in other parts of the body. Naturally, fowls sleep with their heads protected under their wings, so the intruder cannot easily get at their heads. This might possibly be one reason why fowls sleep with their heads in this position. One would little think during the daylight, when he comes upon these "silent bats in drowsy clusters cling," as Goldsmith said, that they could perform murderous deeds at night, and hypnotise the wild horse of the open plains, and even go beyond the protective forces of nature by withdrawing the blood of fowls in such an insidious manner. They have been caught on several occasions in the act of drawing the blood. The hens are found in the morning almost too weak to stand, and in most cases they succumb. It is marvellous how they deprive their victims, both large and small, of all sensation; the animal does not attempt to repel them. The

bat, while withdrawing the blood, continually flutters its membranous wings at a rapid pace, like a hawk or a honey bird when they stand on air in the same position; this seems to hypnotise the victim and may possibly act like ether on their flesh.

Farmers in many parts of the world object to white cattle as being of a more delicate constitution than others of darker colour. It was mentioned by the late Professor Darwin that male white cats with blue eyes are generally deaf; also that colour and constitutional peculiarities go together. He mentioned facts collected by Hensinger that white sheep and pigs are injured by certain plants, whilst dark coloured individuals escape. He mentioned that Prof. Wyman had communicated to him a good illustration of the fact: On asking some farmers in Virginia how it was that all their pigs were black, they informed him that the pigs ate *paint-root* (*Lachnathes*), which coloured their bones pink and which caused the hoofs of all but the black varieties to drop off, and that they selected the black members of a litter for raising, as they alone had a good chance of living.

There are several diseases of animals in Great Britain which we know as being more prevalent in white or grey animals—ex. “white heifer disease,” and “melanotic growths” in grey horses. Stock breeders do not object to white-coloured animals without strong reasons.

It is well known, according to authorities on tropical diseases, that pigmentation follows sunburn, but until recently it was not evident that it was of a protective nature. Unna, in 1885, was the first to say that it was to be regarded as useful, inasmuch as it prevented inflammation.

In 1856 Finsen painted a black ring two inches wide around his arm with Indian ink to imitate the colour of negro's skin and then exposed it for three hours to a very hot sun. For a time the skin remained normal, showing only a little redness at the edge of the black paint, but in due course it became red and inflamed, except where it had been painted black. After several days the erythema disappeared and the area which had been red was noticed to have become distinctly pigmented.

He then exposed it again to the sun, but this time the area which had originally been covered with Indian ink was unprotected. The result was that this part became red and inflamed, while the pigmented area was unaffected, except that it became a little more pigmented.

The experiment of Finsen shows that the colour of native races living in tropics is protective and was possibly originally induced by

the sun. The black skin is protective because it guards the nerve endings from irritation.

As to the origin of the pigment this question, according to those who have made a special study of it, must be considered as far from settled.

There are two possible sources for the melanin :

1. The hæmoglobin of the blood.
2. The cells of the epidermis.

This question of the origin of pigment should make an excellent field of study to some young graduates fresh from our veterinary schools and before the rust of time has an opportunity to step in, unawares, to blur the lustre on their knowledge of anatomy, chemistry, histology, physiology and pathology, most essential subjects for the study of this colour mystery.

SOME CASES OF CALCULI OF THE BLADDER IN CANINE PATIENTS.

By FREDERICK HOBDAÏ, F.R.C.V.S.
(Kensington, W.)

IN the March issue (Page 89) of THE VETERINARY JOURNAL, I published, in conjunction with Mr. Harold Stainton, M.R.C.V.S., an interesting skiograph of calculus in the bladder of a Pekingese bitch, this being successfully removed by supra-pubic cystotomy.

It is strange how it sometimes happens that one gets a sequence of cases of the same variety, and since then we have had no less than eight others, five of the patients being females and three males. Of the females one was almost moribund from another cause when brought to hospital, and died shortly after arrival, a large calculus being found in the bladder on *post-mortem* examination.

One female, a Pekingese, five and a half months' old, had 25 calculi (two about the size of a filbert nut and the others about the size of a pea) removed by supra-pubic cystotomy and made an un-interrupted recovery.

One of the males, a bulldog, brought in on the same day as this latter bitch, had 63, another had 27 small calculi removed from the urethra and also made a good recovery ; whilst the third, a cocker spaniel, was of particular interest, because it was only 11 months' old and it had had the symptoms of bladder irritation sufficiently marked to be noticeable to the owner for five months. When brought to hospital it had complete incontinence of urine and was continually straining ; the appetite was capricious and the dog was evidently in a good deal of discomfort. Examination per rectum and palpation of the exterior of the abdomen, revealed the presence of a calculus which had appar-

ently become adherent to the bladder wall and was wedged in the region of the neck.

Under chloroform an incision was made at the left of the prepuce and a calculus as large as a good-sized filbert nut was removed by the supra-pubic operation. The incontinence ceased three days afterwards and recovery, except for a little buried suture trouble, was uninterrupted.

BOTS IN THE ŒSOPHAGUS.

By WM. PAUER, M.R.C.V.S.
(Blackwater).

At the end of May I was asked to attend to a bay gelding, an Army "boarded out" horse. He was in fair condition and the owner informed that me since the previous day food had been coming back through the nose and that coughing was frequent. When he drank a considerable quantity of water also returned through the nose. I watched him feeding and drinking and found that this took place immediately after swallowing. The animal was bright, temp. 101° and appetite was good. These symptoms continued for 10 days and his condition, when eating, was always the same. There was no swelling in the throat and at no time did he show choking symptoms other than the return of the food and water. I formed the opinion that there was a partial œsophageal obstruction, but was at a loss to account for it. On June 9 he had acute abdominal pain and died after 10 hours' agony. *Post-mortem* showed that this was due to twist of the large intestine. I continued the *post-mortem* examination and found that the lining membrane of the œsophagus four inches from the stomach entrance was simply packed with bots; they extended for about five inches and were obviously responsible for the difficulty in swallowing. The remainder of the œsophagus was normal. He was entirely on a green clover diet during his illness. I regard the intestinal twist as a coincidence.

AN INTERESTING ABDOMINAL WOUND IN A HEIFER.

By GEORGE GIBSON, M.R.C.V.S.
(Oakhams).

In December last, I was called to see a heifer which was stated to have been seriously injured in the abdomen by an axe, the owner stating that the intestines were protruding. The history was that the animal had been trying to get through a gap, and in order to stop her the owner's man, having an ordinary axe in his hand, had thrown it, intending that it should strike her with the flat side. Unluckily, she turned at the moment, and the axe struck her violently with the cutting edge, inflicting a severe wound, severing two ribs and exposing

the rumen and small intestines. I saw it about three hours later and at once advised sending for the butcher, but, being Saturday night, and no butcher immediately available, I sutured the wound, applied Bipp paste and instructed the owner to have her killed as soon as possible.

Passing that way two days afterwards, I called to see what had been done and found the animal still alive. There was no fever and she was eating as if nothing had happened. As the sutures had kept in place and she looked so well, we decided to give her a chance and within a few days the cow made an uninterrupted recovery.

The case is especially interesting on account of the small amount of disturbance shown, as there was no question about the severance of the two ribs; the rumen and intestine being clearly visible. About a foot of the latter was actually protruding and the portion of rumen the size of half an ordinary football. It took more than half an hour's steady manipulation to get these back into place.

CRUDE OIL IN COOKING.

By CAPT. J. J. PLUNKETT, O.B.E., R.A.V.C.,
No. 14 Field Veterinary Section, Waziristan Expeditionary Force.

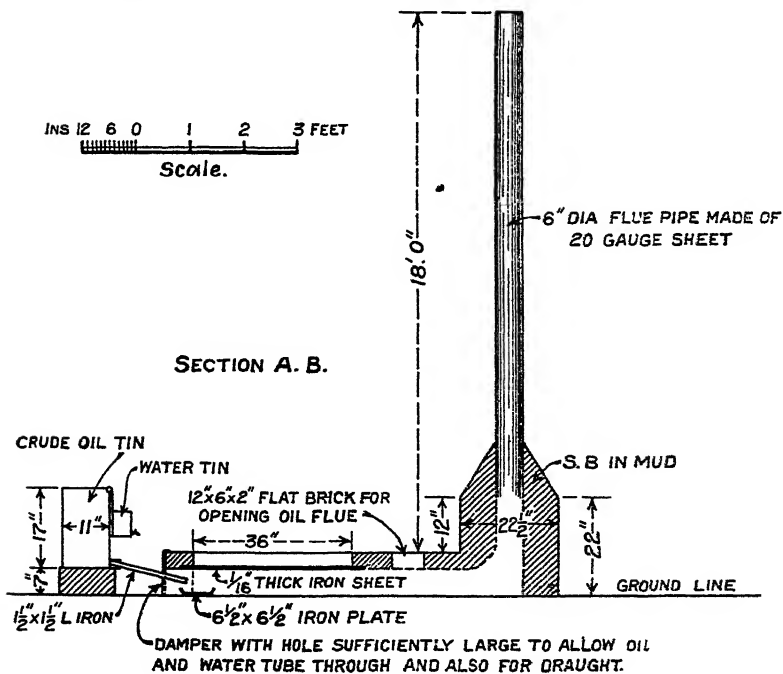
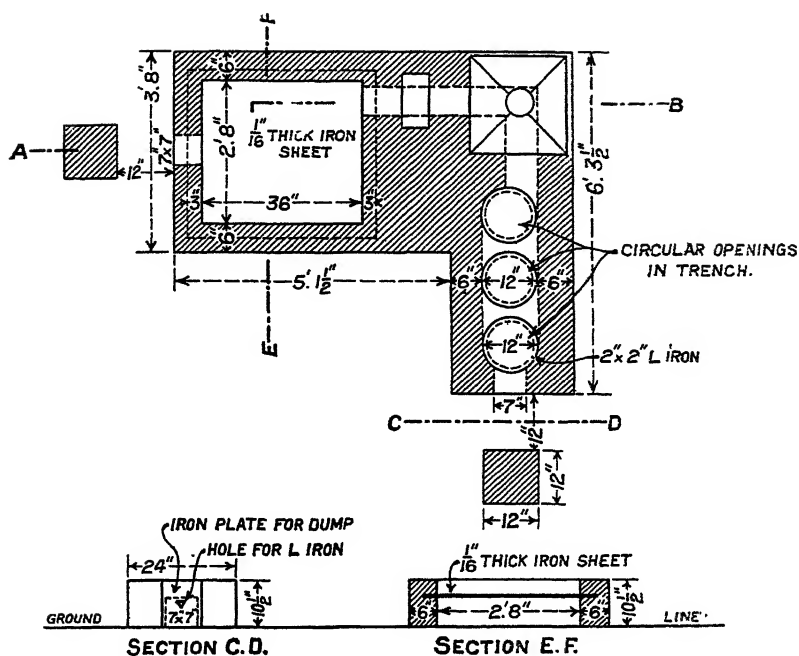
DURING the past few months practically all the cooking of men's food in my unit has been done by the combustion of crude oil.

The ration of crude oil per man per day is 3 ozs. This is in lieu of one pound of wood, and represents half the fuel ration. The remaining half is in wood.

The apparatus required is planned on attached, and is working very satisfactorily up to date.

In this apparatus the crude oil tin is simply a four-gallon petrol tin with tap fitted. A steady trickle of oil is allowed to run from the tap into the tin tube, which conducts the oil on to the plate. The small tin simply hangs by a pair of wire hooks on to the edge of the large tin. It is the water container. The water is allowed to flow at drop-drop pace on to the tin tube, where it mixes with the oil and flows on to the plate. Two such water and oil tins are required for the "Degchi" end, and one for the "Chappatti" end.

The Degchi range is simply two thin walls of unburnt bricks and mud, with a trench between them. Three circular four-gallon copper or brass degchis are sent in, resting on "L" iron, which is resting on the walls. The degchis are set in mud plaster for about four inches from the bottom, and easily lift out. When replaced, a little plaster of mud between them and the dry plaster prevents the escape of heat and smoke. It is necessary to change the pots frequently, as the one nearest the oil gets the best of the flame.



The end of the trench nearest the oil and water tins should be stopped by a thin iron damper with opening just large enough to admit the oil tube. This helps the draft very much.

The chappatti plate is set on walls like the degchis, but the width of the trench is greater. The plate is 1-16th inch thick. Thicker plate was tried at first, but was not so successful, as it took much longer to heat.

The taps used in the oil cooker of this unit were invented by Sergt.-Major Palmer, the supply from Military Works being too clumsy. This tap is simply a motor bicycle valve with a stopper tube fitted into it. This second tube, by screwing in or out, lessens or increases the valve opening and makes an excellent control for the oil and water supply.

The combustion is started as follows: A supply of oil and water is poured into the tins, all cooking pots and dampers are put in position. Some tow, soaked in crude oil, is put on to the plate in the trench, and lighted. The damper is then put back, and the flow of oil is regulated to a steady constant stream from the tap. The water is allowed to drop, drop slowly.

As soon as the plate is hot, remove the tow. The hot plate is very important in the process of combustion. The oil and water must pour steadily on to the plate, and not flood it. If the draught is right, a roaring noise is soon heard inside the trench, and the enormous flame heats the chappatti plate sufficiently in a few minutes, and gradually cooks the contents of the pots. The only outlet for air should be as far as possible the chimney. It must be cleaned often. This can easily be done from above with a long stick and some sacking, and the movable brick below makes it easy to clean the trench and remove the soot.

Owing to the experience and marked keenness of F.Q.M.S. Palmer, my oil cooker was the first to work satisfactorily in Dera Ismail Khan, and was a great help to the M.W.S. as a pattern. All the handiwork of fitting taps, tubes, etc., and the whole supervision was carried out by F.Q.M.S. Palmer.

A meal for 110 men can be cooked comfortably in one and a half hours. This means about twelve gallons of liquid such as dhal and curry to cook, and 220 chappattis.

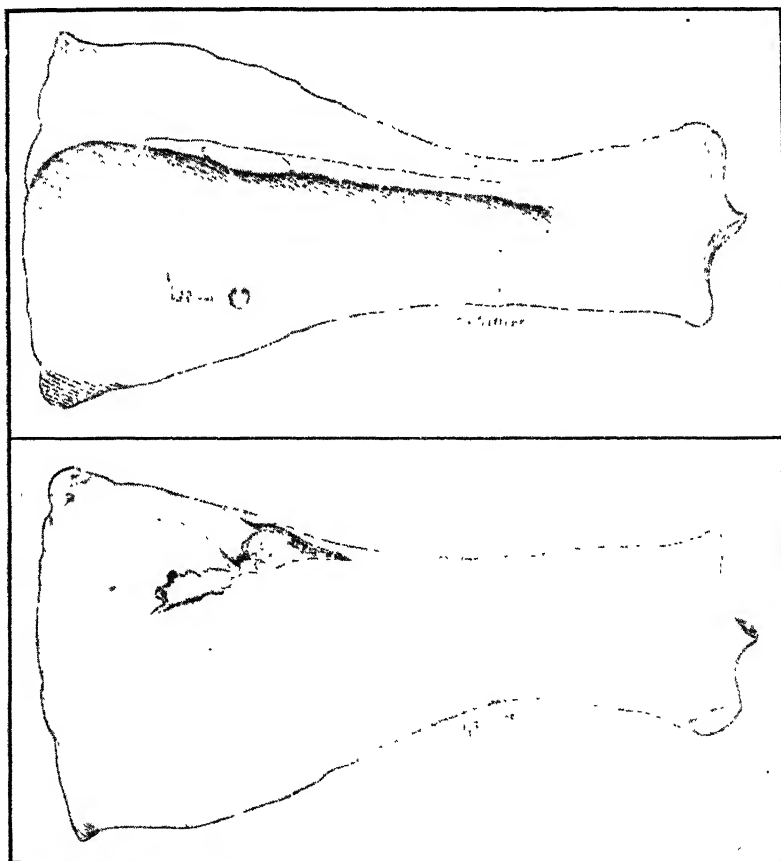
The cooker is worked entirely now by Syces, who are employed as cooks. They had to be very carefully supervised for some time, owing to their aversion to leaving their old-fashioned wood fire, but now they realise the comfort of no smoke and easier working, and are more devoted to the oil fire. I hope, with time, to work on a little

less crude oil, as I believe at present the cooks waste a little which might be saved. This, of course, is largely due to the fact that they are not very intelligent or extra keen.

THE INGRESS AND EGRESS WOUNDS OF A BULLET
THROUGH THE SCAPULA.

By FREDERICK HOBDAY, F.R.C.V.S.
(late Major, Royal Army Veterinary Corps).

THE subject of the illustration is of great interest in that it shows the apparently slight injury to a flat bone (the scapula) at the point of entrance, and the shattering which takes place at the point of exit.



This has been observed and written upon by numerous writers, but these illustrations add another item of fact.

The patient, a light draft horse, was evacuated to No. 22 Veterinary Hospital with a small bullet wound in the shoulder, not at all a formidable-looking wound, and the animal was not excessively lame at the time. Progress was, however, unfavourable, and eventually the animal was destroyed.

Post-mortem examination revealed the splintered pieces of bone imprisoned behind the scapula, and when the bone was boiled out, the condition of affairs was shown as in the drawings, which were made at the time.

Abstracts.

ON THE TREATMENT OF UMBILICAL HERNIA IN THE HORSE WITH CLAMS.

By PROFESSOR SCHWENDIMANN,
of Berne.

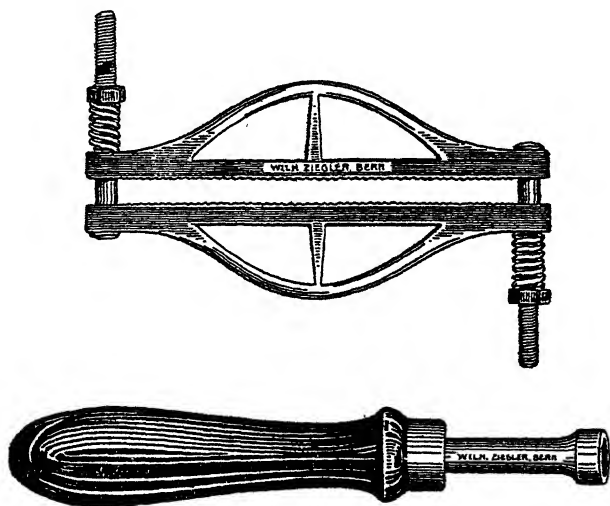
CASES of umbilical hernia in foals are more frequently met with in the clinic to-day than formerly. Very seldom do we meet with intact hernia; for before the animal is brought to us for treatment all that is possible has been done to remove the defect. One often finds the skin cicatrised, thickened and consolidated with increased growth of the hernial tissues underneath or adhesion of the hernial contents to the skin. It is evident that such complications render treatment more difficult and limit the chances of cure. On this account I am describing a method of treatment applicable to private practice. It is the oldest method known and means the clamping of the hernial sac. The possibility of a bloodless taxis, as well as a not too large hernial ring, are essential conditions for its employment. In other cases radical treatment consisting of herniotomy and direct union of the hernial ring by suturing is to be preferred.

Clamping is often put off for unreliable palliative cures. The success of these is quite uncertain. My view is that the method of procedure is far less important than the handling of the case. It is not always sufficient to put on a more or less firmly fixed clam, but a whole series of conditions must be observed, if a good result is to be produced. In literature and text-books much too little stress is laid on these important points.

First of all, the nature and construction of the clam is of substantial influence. Wood, iron and aluminium clams are all unsatisfactory. They close too faultily or are too weak, stretch and act unequally or insecurely. On this account all these clams are to be avoided whose parts are bound at the ends or are furnished with a hinge. On closing such clams, pressure can never be equally maintained. All clams

bent on the surface or edges are unsuitable or quite superfluous. A good clam is made of best steel, whose level arms are closed at both ends with a screw encircled by a nut.

An ideal one is that of Salvisberg. All parts consist of steel. The arms are flat and widely windowed, furnishing light weight with solidity. The grooved pressure surface is only 7 millimetres broad and with the continued spring pressure at both ends acts so steadily and uniformly that the removal of the whole extent of the hernial sac is accomplished in 15-20 days.



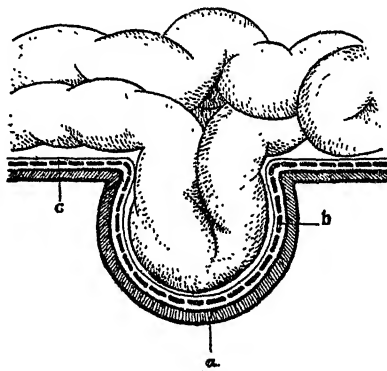
Salvisberg's Clam and Screw Key.

The operation should not be performed on too young a subject. Apart from the fact that small umbilical hernias disappear spontaneously in yearlings and the danger of strangulation is small, it is my opinion that it is advantageous to have a certain firmness in the abdominal coverings. On septic and antiseptic grounds it is essential that the whole area, and around it, of the hernial sac should be shaved. The hair should be clipped off to avoid the destructive effect of the clam.

The only great danger with which we have to reckon and of which we ought to acquaint the owner, is tetanus infection. To limit the recurrence of purulent inflammation, the shaved and disinfected skin is painted with tincture of iodine.

The reposition of the hernial contents presents no difficulties in simple hernias and is generally accomplished with the animal on its back

The subsequent method of putting on the clam is of the greatest importance. It is essential that *not only the skin, but always also the fascia transversa abdominalis and with it the extruded portion of the peritoneum must be embraced by the clam*, otherwise it is certain a mishap will occur. As Gustmann has observed, in the clam method it is essential that the serous surfaces of the hernial sac adhere to the greatest possible extent.



The Hernial Coverings of Umbilical Hernia in the Horse.

- a. Skin.
- b. Fascia Transversa Abdominalis.
- c. Peritoneum.

But this can never happen if the fascia with its peritoneal covering is shoved back, or quite reduced with the hernial contents, so that they cannot be included in the clam pressure. The most important moment of this simple operation is the proper putting on of the clam. It is done in this way that the hernial tissues (skin, fascia, transversa and peritoneum) emptied of their contents, are drawn through the moderately opened clams, whilst an assistant on the opposite side holds the clam with both hands firmly pressed up to the abdominal wall, so that the instrument may be brought as near as possible to the hernial ring. The clam is now closed with the screw key, or better still, with screw keys operating at both ends at the same time. During the whole procedure the assistant remains at his post and presses the clams to the belly. After these are fixed sufficiently firmly, one takes time for their further closure and does it at intervals.

Where a large hernia exists, or where the opening into the sac has been destroyed, the clams can be put on obliquely or diagonally. With very large hernias, however, I prefer herniotomy.

If the clam has been put on rightly, the transversas and peritoneum can be felt in the hernial sac just as one can feel the fold of the shirt through the coat-sleeve.

After letting the subject up, bandages may be put through the windows of the clam and fastened on the back or sides so as to support it and keep it well up to the belly.

After-treatment is simple, the screws are tightened once or twice and when pus forms on the wound rinse with sublimate water and dust with wound powder. After falling off of the hernial sac cleanse the wound and dress with aloes and tincture of myrrh.

Do not fasten the food up but put in a loose box.

—*Swiss Veterinary Journal*.

G. M.

ABSTRACT FROM THE WORK OF THE DIVISION OF
VETERINARY SCIENCE IN CALIFORNIA, U.S.A.*

Making Cattle Environments Free from Infective Tuberculous Material.—The conditions under and the influence to which tubercle bacilli from tuberculous cattle are exposed outside of the animal body are many, and in our experiments it has been our aim to represent the most important of such, especially as they obtain in California.

In two series of experiments Traum has found that, when tubercle bacilli from lungs of infected cattle were exposed in a 1 in. thickness of manure on the ground, they were alive, in one series, at the end of 140 days and, in the other, at 71 days. In the first series, they were dead at 171 days and in the second at 94 days.

Tubercle bacilli, exposed in the first series, retained their virulence for guinea pigs for over two months longer than those in the second series under practically the same conditions. These results are in accord with the findings in our other experiments. The facts to bear in mind are that the two experiments were planted two months apart and that in both cases the tuberculous material became innocuous soon after the rains stopped, when they were no longer kept moist. There appeared to have been very little weakening of the tubercle bacilli during the rainy season.

A third series was carried out to determine how long tubercle bacilli would live when exposed to California climatic influences when no rains intervened and to what extent cattle would become infected with such materials. Seventeen days after being placed in the experiment plot, tuberculous material exposed in $1\frac{1}{2}$ in. thickness of manure was no longer able to produce tuberculosis in either guinea

*From the Report of the College of Agriculture and the Agricultural Experiment Station of the University of California (July 1, 1918, to June 30, 1919).

pigs or in cattle. The guinea pigs were given direct inoculations, while the cattle were exposed in a small pen and forced to be in a cloud of dried tuberculous matter for an hour on each of two successive days, and were also fed with hay thoroughly mixed with the dried tuberculous material.

In water holes, on the other hand, we find 687 days after exposure in one experiment and 548 days after exposure in a second, that the tuberculous material is still capable of producing tuberculosis in guinea pigs when inoculated. The end point in first experiment was apparently reached.

In the case of exposure of tuberculous material when kept moist as in a water hole, it was deemed necessary to determine to what extent the cattle would become infected when exposed to such material. We found that all of three cattle became tuberculous when forced to drink water taken from water holes ninety-eight days after such holes were infected with tuberculous material. The end point in this experiment was not yet reached. All of six cattle exposed earlier in the experiment also became infected.

The practical significance of these findings is very evident, namely :

Environs contaminated with tuberculous discharges from cattle become free from such infective materials soon after the media in which they are contained are freed from sensible moisture. On the other hand, tubercle bacilli that are found in water holes, mud holes and watering troughs retain their virulence for a considerable length of time.

Chicken-pox (Epithelioma Contagiosum).—Losses from this disease have been greatly reduced by the use of a vaccine distributed by this station. The preparation and use of this are described by Beach in circular No. 145 of this station. One injection will usually produce sufficient immunity to protect fowls against natural infection for a year. The immunity does not reach its full development until three to six weeks after vaccination. Experience in the field has shown that occasionally a second injection is necessary to stop the spread of the disease. The vaccine appears to have considerable therapeutic value when administered to infected fowls. When properly administered, it is harmless to healthy fowls. It does not retard the development of growing fowls, nor directly decrease the egg production of laying hens. It has been found that the immunising value of the vaccine varies in direct proportion to the virulence of the virus contained therein. It has not yet been possible to perfect a vaccine

which will always produce absolute immunity against severe artificial infection.

In inoculating Leghorn cockerels for the production of chicken-pox virus used in the preparation of vaccine, the amount of dried scabs produced per bird was about 4 grams. The mortality of the birds used was over 50 per cent. The amount of scabs produced per bird was greater, and the percentage of mortality less during warm weather or when the birds were kept in a warm room. Pox of turkey was found to be transmissible to chickens, and chicken-pox to turkeys.

Sour-Milk Treatment for Poultry Diseases.—In confirmation of observations at other stations, it has been found that coccidiosis in chicks and entero-hepatitis in turkey appear to be beneficially influenced by a sour-milk diet. Observations covering a period of three years show that these diseases have been promptly checked and birds successfully matured in infected yards when fed liberal amounts of sour milk with a restricted grain and mash ration. Further work should, however, be done to establish the value of this mode of treatment with certainty.

Bacillary White Diarrhœa.—To determine the efficiency of the "Intradermal Test" for the detection of *Bact. Pullorum* infection in mature fowls, 140 birds were subjected to both this test and the "Agglutination Test." The results indicated that the Intradermal Test is not reliable.

One outbreak of a rapidly fatal disease of mature fowls which caused a loss of more than 25 per cent. of the flock was found to be due to *Bact. Pullorum* infection.

Avian Tuberculosis Detected by Intradermal Test.—This disease has been found in flocks in several different sections of the State. The results of an investigation of the "Intradermal Test" would seem to confirm the work of Van Es that this is a fairly reliable means of detecting tuberculosis infection in fowls.

Fowl Cholera in Turkeys Not Controlled by "Bacterins."—In turkeys, the results of an investigation of the value of autogenous bacterins in control of the disease seems to indicate that the bacterins have neither curative nor immunising value.

Intestinal Round Worms Expelled by Tobacco Dust.—Investigations in co-operation with Dougherty in the control of round worms has shown that "tobacco dust," added to dry mash in the proportion of

1 lb. tobacco to 50 lbs. mash and fed daily for two or three weeks is an effective means of expelling these parasites. Good results were also obtained with tobacco dust given in a single dose in dry mash, using 1 pound for each 100 birds. The results of investigations not yet completed, of the efficiency of tobacco dust for preventing round-worm infestation and the effect on growth of chicks, if fed daily or intermittently from the age of 30, 50 or 70 days to maturity, seem to indicate that it can be safely fed daily in the proportion of 1 pound of tobacco to 50 pounds of mash from the time the chicks are 70 days old and for periods of 20 days, with an interval of 20 or 30 days between during which no tobacco is fed. Since neither the treated nor check pens have thus far become badly infested with round worms, no information regarding the efficiency of this method of preventing round-worm infestation has been obtained. Oil of chenopodium (American wormseed) proved effective for expelling round worms. The amount used was 1 teaspoonful for each 12 birds, mixed with moist mash. As a single-dose method of treatment this seemed to be more desirable than tobacco dust. The results of preliminary trials with the leaves of plants from which oil of chenopodium is derived indicated that they might be an effective vermifuge for poultry.

Diseases of Sheep.—The increase in the number of inquiries concerning diseases of sheep received recently by this station can be attributed to two causes, *i.e.*,

(1) The rise in value of these animals which is causing owners to take more precautions against loss ; and (2) the increase in the number of flocks in the State kept on small farms.

In the latter case the animals are confined in fields during the entire year and usually receive more abundant feed and less exercise than range sheep. These conditions predispose to preparturient paralysis and similar diseases.

Preparturient Paralysis of Ewes.—Has been investigated by veterinarians of this Station. It attacks fat ewes several days before due to lamb. The cause of the disease has not been definitely determined, but lack of exercise and over-feeding of animals in such condition are no doubt primarily responsible for the trouble. The affected ewes are dull, listless and aimless in their movements. In advanced stages, there is a loss of vision, staggering gait or inability to rise. After five to eight days of illness, the animal usually dies

Prevention has been successful and consists in avoiding conditions that make for the excessive deposition of fat. This can be done by limiting the amount of dry feed given to ewes during the last month of pregnancy and making them rustle for their feed to give them plenty of exercise. Grazing in pastures containing green feed for one or two hours a day will have the effect of giving them succulent food and exercise at the same time.

The ill effects of heavy feeding and lack of exercise are not always confined to the ewes. When sheep in fat condition begin to die, it is usually advisable to move the animals and to change and reduce the feed.

Genito-Urinary Infection in Sheep.—An affection of bucks was investigated which manifests itself chiefly by marked enlargement of one or both testicles and is termed "Big Ball" by the sheep men. A number of cases were examined by Hart, and postmortem examinations held which showed that the testicles were not the only parts affected in all cases. Marked changes were found in the kidneys, bladder, prostate glands, urethra and penis. The infection progresses to the point of pus formation and necrosis of soft tissues. In some cases the entire testicle is destroyed. Cultures made from the affected areas on blood agar developed an organism which proved to be *Bacillus pyogenes*. This organism when injected into the testicle of a healthy buck produced a slowly-progressing inflammation accompanied by pus formation similar to the naturally infected cases.

A number of fatalities occurred from the disease, but its most serious aspect was the fact that a band of these bucks which had either not been visibly affected or had apparently recovered, when bred to ewes, produced a very low percentage lamb crop, amounting to about 33½ per cent. The mode of infection has not been definitely determined, but some evidence was found to show it had occurred through the urethra. The bucks were being kept on very good green feed, and in a large band of several hundred head corraled each night. They were practising sodomy upon each other to a marked degree, and it was from this source that the infection most likely originated.

Treatment of affected animals is unsatisfactory, castration in some cases being indicated.

Prophylaxis would consist in keeping the animals on less stimulating feed without crowding them together at night in corrals, or in dividing them up into much smaller bands.

Necrobacillosis in Lambs.—Two serious outbreaks of necrophorous infection (*necrobacillosis*) in baby lambs were investigated. The disease in this form is somewhat unusual and, in the two flocks mentioned, caused the lambing percentage to drop to about 75 per cent. Lambs are predisposed to this organism through being born in unsanitary lambing sheds or in muddy pastures. Infection presumably entered through the navel and caused death in these cases in from 24 to 72 hours after birth. The most evident lesion appeared in the liver and was characterised by the formation of multiple necrotic areas of a grayish-yellow colour, varying size from a match head to a pea. The necrophorous organism appeared in smears stained from the border of the necrotic areas. Some cases also showed gastric infection. Cleaner lambing quarters, with disinfection of the navel at birth with iodine, were recommended and resulted in an appreciable cessation of deaths.

Reviews.

JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION.
May, 1920. Edited by J. R. MOHLER.—Washington, D.C.
Price 3 dollars, 60 cents.

THIS "journal" is getting back to full post-war vigour. The Editor has a well-reasoned and forcible article on "The Veterinarian and Civil Service." The Joint Congressional Commission has been busy on the Reclassification of Civil Salaries, and it has failed to grasp the scientific usefulness of the veterinarian to the country, and has discriminated against him in regard to both rank and salary. The lay and veterinary inspectors of the Bureau of Animal Industry have a just cause of grievance against the Government in this respect, and they have a fine champion of their cause in the Editor, who takes up the cudgels for them with no uncertain grasp. The keen attention to detail necessary to overcome outbreaks of "White or Calf Scours" is ably discussed by W. L. Williams, W. A. Hagan, and C. M. Carpenter. It is shown how important it is to have clean milk for bucket-fed calves. When a calf gets scours, the procedure is immediately to withdraw all food, give high enemas of physiological salt solution, and large doses of serum until the dysentery is checked, followed by bacterins employed freely. In some cases boiled, and in others autoclaved, milk as brown as coffee produced very good results, along with the therapeutical agents above mentioned, but a clean mother's udder and a clean hind end to the calf are also essential. Other subjects written about are "Strongylidosis in Horses and Mules," "Control of Abortion," "The U.S.A. Army Meat Supply," etc. A very concise and interesting article appears by L. C. Kigin, Lafayette, Indiana, on "The Purpose and Scope of Veterinary Extension Work." The

author's opening sentence is full of import to the veterinary profession. It is a point that needs stressing to-day—"The purpose of all extension work is to educate the masses along certain lines of work that will be beneficial to community welfare." The lines of education at work comprise "Disease Prevention Work and Veterinarians and Disease Prevention Work with Farmers," and we may add "all stockowners." How true it is that modern science and up-to-date intelligence ought to concentrate on eternal instruction and insistence on the measures to adopt in the prevention of disease rather than in its cure.

"Abstracts, Army Veterinary Service List, and Reports of Veterinary Medical Societies" conclude the publication, and in a communication to Dr. Eichhorn, the Secretary of the British Section of the Committee expresses a doubt as to whether the nations of Europe will take up the holding of a National Veterinary Congress for some years to come.

G.M.

ANNUAL REPORT OF THE EGYPTIAN MINISTRY OF AGRICULTURE, 1917.

We have before us the Annual Reports of the Veterinary Service of the Ministry of Agriculture, Egypt, for the years 1916 and 1917. The reports show good work done under very difficult conditions, as during these two years Egypt was practically a back area of our fighting fronts.

Cattle plague in 1916 only accounts for 18 deaths, a very marvellous record seeing that for the whole period from June, 1903, when the disease made its reappearance in Egypt, 176,564 deaths have been reported. In the years under record the outbreaks occurred in Ginga and the Dagahlêya Provinces where certain animals were infected with virulent nasal discharge and then injected with anti R. Serum, but no double inoculations were carried out. During the four years, 1913-16, 289,423 cattle have been doubly inoculated and amongst these only 828 cases of rinderpest have occurred, the curve giving the incidence of the disease showing a sharp decline during the last three years.

In 1917, 4,794 deaths from cattle plague were reported, and the number of anti-rinderpest inoculations carried out was 80,036, of which 77,641 were serum and nasal discharge. The total deaths from cattle plague amongst those inoculated was only 6.

Rabies : 78 cases are reported in 1916, and 126 in 1917.

The following animals were affected:

	1916				1917			
Dog	72	..	..	..	III		
Cat	I	..	..	..	5		
Horse	I	..	..	..	I		
Cattle	I	..	..	..	2		
Donkey	3	..	..	..	2		
Wolves	4		
Buffaloes	I		
		<hr/>				<hr/>		
		78				126		

In 1916 7,303 ownerless dogs and cats were seized and destroyed in Cairo and 9,339 in 1917.

In the city of Alexandria, 5,596 ownerless dogs and cats were destroyed in 1916 and 2,858 in 1917, while in the provinces, 50,122 of these animals were destroyed in 1916 and 45,463 in the following year.

Glanders.—50 cases occurred in 1916 and 53 in 1917. The number for the former year including 2 cases which occurred amongst animals of the Expeditionary Force.

Epizootic Lymphangitis.—16 cases were reported in 1916 and 19 in the next year.

Anthrax.—The few cases which occurred were confined to the quarantine pens at Alexandria and Cairo.

Sheep pox.—91 cases were reported in 1916 and 123 in 1917.

Foot and Mouth Disease.—The country is stated to have been free from cases of this disease in 1915, but it appeared amongst animals imported from Cyprus and the Sudan in 1916, and in that year 10,635 cases are reported. These fell to 759 in 1917; all of the cases, except 12 in the latter year, occurred in the quarantine pens amongst animals from Cyprus and the Sudan.

Hæmorrhagic Septicæmia.—81 cases occurred amongst buffalo cattle and camels in 1916 and 87 in 1917.

Croupous pneumo enteritis of sheep.—46 cases were reported in 1917.

Trypanosomiasis.—60 cases reported in 1916 and 148 in 1917. In the former year the majority of the cases reported occurred in the Faiyûm, whereas in the following year the disease would appear localised around Cairo and the Canal.

Piroplasmosis.—

	1916				1917			
Horse	14	..	..	..	1	
Cattle	155	..	..	..	117	
Sheep	49	..	..	..	2	

Tuberculosis.—1,829 cases were reported in 1916 and 3,737 in 1917.

Contagious bovine pleuro pneumonia.—In 1916, 187 cases of this disease are reported amongst cattle arriving in quarantine from the Sudan and 163 cases amongst similar cattle in the following year, whilst 18 cases were also detected amongst cattle from Cyprus. No cases occurred amongst Egyptian cattle in either year. The disease appears to have been very prevalent in the Sudan in 1915 and 1916.

Correspondence.

CANKER OF THE EAR IN RABBITS.

DEAR SIR,—I hope you will allow me to add a few words to my article in your March number and to Mr. Piller's note thereon in your April issue.

First of all it must be stated that, encouraged by the interest taken in the matter, I have spent a lot of time recently in going more closely

into the matter of this ear trouble in rabbits, and I must take exception to the term "accidental parasite" in this connection. I have known of this creature, now identified as *Glycyphagus domesticus*, for years, as apparently causing a certain amount of trouble, but did not give the matter serious attention until a valuable young rabbit was on the point of dying from an ear complaint a year ago and was completely cured by Andre's liniment. Several larvæ were got out of this rabbit's ears, but no maturer forms, for the ears were dressed more than once before a search was made. As a matter of fact, our present rabbits have never been free from this parasite since they were apparently introduced in the ears of three rabbits purchased from Lady W——'s rabbitry in January, 1917. These purchased rabbits were the descendants of some animals imported from Germany in 1913. We cured, or thought we cured, the canker in 1917; but it has always been more or less evident in animals of other breeds which have occupied the same hutches and it has probably been the indirect cause of more than one rather mysterious death, attributed at the time to something else.

However this may be, I continue to get the parasite out of the ears of rabbits showing signs of slight canker. I have also within the last fortnight got back some rabbits bred and reared here two years ago. One of them has bad canker of the ear. The first thing got out of its ear was a large specimen of a female *Glycyphagus domesticus*, showing an egg about to be laid; also several smaller and less mature individuals. Before the ears were attended to the rabbit was off its feed and very dull and mopish; it has since become cheerful and hungry and altogether different. That the parasite breeds in the ear there is very little doubt, and the chain of evidence is almost complete.

Mr. Pillers and others kindly gave me the names of books dealing with Mites and I have now investigated many sources from which the creatures might have come "accidentally," without being able to reach any conclusion other than that *Glycyphagus domesticus* breeds in the rabbit's ears.

I may say that in the course of this investigation I have recently found many creatures both in rabbits' and guinea pigs' ears, which I have no reason to suppose are other than accidental and which have in some cases also been found in the hay and other food. For instance, rabbits' ears have yielded, in addition to the Mite already mentioned, an occasional *Aleurobius farinae*, *Listrophorus gibbico* and two creatures at present unidentified; while from guinea pigs' ears have been taken *Glycyphagus domesticus*, *Aleurobius farinae*, *Cheyletus eruditus*, and one creature at present unidentified. Mr. Pillers has kindly seen and identified most of the above. These were all mature specimens and in no case have a series of immature forms been found such as is invariable in the case of *Glycyphagus domesticus* in the rabbit's ear.

As young rabbits of the same sex and from the same litter may be $\frac{1}{2}$ lb. less in weight than healthy rabbits at 10 weeks old, if troubled with ear parasites, the economic importance of keeping them free is obvious.

C. J. DAVIES.

TWO NEW VETERINARY SCHOOLS.

Two fresh Veterinary Schools are about to be started in Europe, one at Zagreb (Agram) for the Yugo-Slavs, and the other at Brünn for the Czecho-Slavs.

The names of the various professors, and the actual course to be taken by the students, are not yet available.

ERRATA.

OWING to an error on the part of the printers, the name of Mr. Frank Chambers, F.R.C.V.S., Wolverhampton (late Acting Major, Royal Army Veterinary Corps) was omitted as the author of the article on page 181 of the May issue entitled "Note on the Effect of Train Journey during the Winter Months, and the Time elapsing between Detraining and Actual Embarkation, on the Prevalence of Pneumonia on Board Ship."

PUBLISHER'S NOTICE.

Owing to the recent further increase in the cost of printing and paper, we are reluctantly compelled to advance the price of the VETERINARY JOURNAL from 1s. 6d. to 2s. per copy. The Annual Subscription will be 21s., post free, instead of 18s., and the annual combined subscription with the VETERINARY NEWS will be 32s., post free. These revised rates to take effect as from July 1, 1920.

No increased charge will be made for subscriptions already paid to the end of the current year.

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PROFESSOR O. CHARNOCK BRADLEY, M.D., D.Sc., Ch.B.,
President of the Royal College of Veterinary Surgeons.

THE VETERINARY JOURNAL

Editor :

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Sub-Editor :

GLADSTONE MAYALL, M.R.C.V.S.

JULY, 1920.

THE NEWLY-ELECTED PRESIDENT.

PROFESSOR BRADLEY is too well known in the profession to need any introduction to its members, and his selection for the Presidential chair is a popular one.

A Lancashire man by birth, his distinguished scientific career commenced with his graduation as a Member of the Royal College of Veterinary Surgeons in 1892, his *Alma Mater* being the New Veterinary College, Edinburgh. Appointed to the teaching staff, he held the position of Professor of Anatomy until 1900, in which year he transferred to the Chair of Anatomy in the Royal (Dick) College, when this chair was vacated by the late Professor Mettam. In 1911 the Governors of the Dick College appointed Professor Bradley to be Principal, and it has been under his guidance that the present College Buildings have been built. Elected a Member of Council in 1911, and Vice-President in the years 1912 and 1919, his selection as President has come at a time when the affairs of the Royal College of Veterinary Surgeons, especially financially and educationally, are assuming a serious aspect. His personal knowledge of medical and scientific examinations will be of the greatest value to pilot the ship into a safe harbour, as Dr. Bradley holds the M.D. and D.Sc. of Edinburgh University, and the Fellowship of the Royal Society of Edinburgh, upon whose Council he has several times been elected.

Editorials.

A NEW MILK BILL.

A BILL to amend the Milk and Dairies (Consolidation) Act, 1915, is now before Parliament. It is of great interest to veterinarians and a step forward in the effort to secure for the nation a supply of clean milk. One of the chief defects of previous milk regulations has been that milk could be produced in sheds and shippens, structurally quite unfit for the obtaining of clean milk. It is true that recommendations have been made as to structure of floors, length and width of stalls, height of the buildings, plan of gutter and drains, etc., but too often these regulations have been more honoured in the breach than the observance. In not a few cases landlords have refused to carry out the necessary alterations, and tenants have not seen their way to do them. An improvement in this respect may take place under the present Bill, for the local authority will have the power, if it becomes an Act, of granting, renewing, suspending and revoking licenses of dairies and dairymen.

The Minister of Health may make it a condition of "the appointment or employment of a veterinary inspector that he shall not engage in private practice." It looks also as if two or more sanitary authorities will be able to combine and appoint a veterinary surgeon to supervise the supply and perhaps the distribution of milk in their areas.

As regards tuberculosis, local authorities may authorise or require any dairyman "to carry out such tests for tuberculosis or other diseases as may be required by the Order." We think that this clause might be better drafted. It does not say that the tuberculin test must be carried out by a qualified veterinary surgeon. There are many wise men who think that the whole operations of the production and distribution of milk should be under veterinary supervision, and it is certain that our profession should take a large part in the matter.

The grading of milk will probably become an accomplished fact when the Bill becomes law, and those who want clean milk will doubtless have to give a higher price for it than those who care not about bacterial and manurial contamination. This, in our opinion, is only just.

The effort to make milk pure at the beginning is worthy of all support, and has far more to recommend it, and is far more rational than dabbling with the removal of impurities by scientific methods from its origin and away down its bandying about from the cow's teat to the human mouth. There is much in the Bill worthy of earnest perusal by the members of our profession, and therefore we reprint its full text in this issue.

SCIENTIFIC ESTIMATES OF FOOD STUFF VALUE.

WE reproduce in this month's issue a paper on the economical value of feeding stuffs, which will be of great interest not only to the third-year student in his hygiene course, but also to the practitioner, whom it will furnish with much valuable information to impart to his farmer clients. The paper is an essentially common-sense and practical one, and is written in plain, simple language which will appeal to everyone. Its keynotes throughout are efficiency and economy, and it particularly demonstrates that the scientific farmer who reasons things out and takes the trouble to make his own compounds of meals and mixtures for young stock not only saves considerably in the quality of the stuff, but in the cost of the product. The methods of feeding animals varies very much in different districts, and too much knowledge on this important subject cannot be placed before the student of veterinary hygiene and dietetics.

THE REORGANISED AMERICAN ARMY VETERINARY CORPS.

THE American Army Veterinary Corps is still to remain on a permanent footing and consist of a portion of the Medical Department. It is intended that it shall have 140 officers, in rank ranging from colonel to second-lieutenant, but our professional colleagues consider that, as the standing army is to consist of 299,000 enlisted men and about 17,700 officers, it will be necessary to provide a minimum of 200 veterinary officers and at least 2,000 men to efficiently cope with the duties of an efficient veterinary service.

Original Communications.

GORSE AS FOOD FOR FARM ANIMALS.

By J. J. GRIFFITH, B.Sc.,

*Lecturer and Adviser in Agricultural Chemistry, University College of Wales,
Aberystwyth.*

IN many parts of Wales gorse chaff was at one time extensively used as fodder for both horses and cattle. There are several isolated districts where the practice is still maintained, although to a much less extent than was the case five or ten years ago. Inquiries received from a number of farmers regarding its nutritive value suggested the advisability of ascertaining the composition of typical examples of the gorse that is used for feeding in various districts.

There seems to be considerable variation of opinion among farmers as to the relative merits of the different kinds of gorse. For example,

some farmers maintain that gorse of one, two, or at most a few years' growth cut down to the level of the ground is the only kind that is worth utilising. On the other hand there are equally well experienced farmers who are of opinion that the branches of large gorse bushes are at least as good and may be superior in value. Again, there appears to be some difference of opinion as regards the relative values of gorse which has been artificially sown and that which has sprung up upon the land in a natural way.

Further, whilst the type of gorse which flowers in the spring (*Ulex europæus*) meets with general approval, one does not find anything like a consensus of opinion as regards the feeding value of the gorse that flowers in the autumn (*Ulex Gallii*).

In selecting samples for analysis an attempt was made to take into consideration all circumstances which might influence the composition of the gorse used in different districts.

Table I. shows the composition of twelve samples of the spring flowering gorse. The variation in the percentage of water is to be attributed mainly to the inequality of the intervals between the times of sampling and the times of analysis of the different samples, *i.e.*, to variation in the amount of desiccation previous to analysis.

Particulars concerning the samples.

No. 1.	Branches from gorse bushes in Cardiganshire.		
„ 2.	Do.	Do.	Do.
„ 3.	Sown gorse, one year's growth, from Pembrokeshire.		
„ 4.	Do.	Do.	Do.
„ 5.	'Sown gorse, two years' growth, from Carnarvonshire.		
„ 6.	„	one year's	„
„ 7.	Natural gorse from Cardiganshire.		
„ 8.	„	„	Pembrokeshire.
„ 9.	„	„	Carmarthenshire.
„ 10.	„	„	Pembrokeshire.
„ 11.	Sample from Carmarthenshire.		
„ 12.	„	„	Merionethshire.

The figures given in Table I. show that, after making allowance for the variation in the moisture content, the samples analysed are fairly uniform in composition. The carbohydrate and fibre are the constituents which fluctuate most. The amount of indigestible fibre present is very much increased and the percentage of soluble carbohydrates is proportionately lowered as the gorse advances in age (see No. 5). Hence to secure the maximum nutritive value it is

advisable to cut the gorse at as early a stage of growth as is practicable. This is of particular importance if the gorse is to be supplied to working horses, because when horses are performing hard work it is not advisable or economical to include a large amount of indigestible matter in their daily ration.

Samples 1 and 2 may be taken as representative of branches cut from gorse bushes. Provided such branches are comparatively young, and are green and fairly succulent throughout, their nutritive value seems to be about the same as that of an ordinary gorse crop.

On comparing the results obtained with samples of natural and of sown or cultivated gorse we find that they do not present any very marked contrast in chemical composition. Assuming, therefore, that in age and other circumstances the natural and sown gorse are similar they are not likely to differ much in their nutritive value.

The most convenient means of illustrating the significance of the figures given in Table I. as regards the feeding value of gorse is to compare the average composition as given in the last column with the percentage composition of hay and straw. Since, however, the amount of water present in gorse is much greater than in hay and straw, the comparison may be simplified by giving the percentage composition of the *dry matter* in each food.

Table II., shows the percentage composition of the dry matter of gorse, meadow hay and oat straw.

TABLE II.

	Gorse.	Meadow Hay.	Oat Straw.
Albuminoids (Crude Protein)	12	11 $\frac{1}{4}$	4 $\frac{3}{4}$
Oil (Crude Fat)	3 $\frac{1}{4}$	2 $\frac{3}{4}$	2 $\frac{1}{4}$
Carbohydrate	38 $\frac{1}{2}$	50	43 $\frac{1}{2}$
Fibre	42 $\frac{1}{4}$	29	42 $\frac{1}{2}$
Ash	4	7	7
	100	100	100

Table II. indicates that, when estimated on the basis of the composition of the dry matter, the nutritive value of gorse is lower than that of meadow hay, but is considerably higher than that of oat straw. It is true that the average sample of gorse contains more indigestible fibre and a smaller amount of carbohydrate than oat

straw. But, on the other hand, it contains a high percentage of albuminoids, and this is a particularly desirable feature of its chemical composition, because albuminoids (protein) are in many respects the most important constituents of food.

Table III. shows the results obtained in the analysis of three samples of autumn flowering gorse. In each case the sample was taken from the green succulent branches of gorse bushes.

TABLE III.

No. of Sample.	13.	14.	15.
Water	42.89	39.67	50.12
Crude Protein.. ..	5.52	6.24	5.24
Crude Fat	2.00	1.82	1.51
Soluble Carbohydrate ..	20.76	25.69	18.39
Fibre	26.48	24.11	23.12
Ash	2.35	2.47	1.62
	100.00	100.00	100.00

The number of samples dealt with was too small to enable one to draw any very definite conclusions regarding the relative feeding values of the europæus and Gallii varieties. At the same time it is evident that the two varieties are approximately of the same chemical composition and therefore probably of similar nutritive value.

GENERAL CONCLUSIONS:—

The results of the analyses clearly indicate that the feeding value of gorse is very considerable. Therefore, farmers who have been accustomed to utilise it as food for horses and cattle would do well to continue the practice. It is possible also that under certain circumstances its use might be extended with advantage. In Wales there is a very considerable area of land on the steep slopes of the hills which provides but very little food when grazed. The cost of keeping such land under cultivation is often prohibitive. But if it were put down to gorse it might produce several tons per acre annually of useful fodder, for it is on land where the soil is shallow and stony that the best crops of gorse are often obtained.

In many localities gorse is the chief natural product of land commonly regarded as waste. Consequently, even in districts where gorse is not cultivated, considerable use might be made of natural gorse, especially in seasons of scarcity of winter fodder. Shortage of hay, straw or roots might in this way be remedied without the necessity

of incurring any additional expenditure on purchased feeding stuffs. This is obviously a matter of great economic importance when the market prices of cakes and meals are abnormally high, as is the case at present.

In the light of the analytical results obtained, together with the experience of many farmers, the advantages of gorse as food for stock may be briefly summarised as follows :—

- (1). Heavy crops of gorse may be raised on poor thin stony soils upon which little else may be grown, and on steep slopes where continual cultivation would not be remunerative.
- (2). It is particularly useful as winter fodder when, as the result of the dryness of the previous summer, the supplies of hay and of cereal straw are short.
- (3). Being comparatively rich in albuminoids, it serves to raise the albuminoid ratio of a diet which includes a fair amount of cereal straw.
- (4). As a green succulent food it may be a particularly desirable constituent of a ration when the supply of turnips is comparatively small.
- (5). Under several circumstances the use of gorse may be recommended to supplement other home grown foods in order to economise the use of purchased feeding stuffs.
- (6). Experience shows that it gives very good results when supplied to milk cows. This is true both as regards the yield of milk and the quality of the produce. It has been observed to be very beneficial in its effects upon the general quality and particularly the colour of butter.

Clinical Cases.

COMPLETE PROLAPSE OF THE UTERUS IN A BITCH. AMPUTATION AND RECOVERY.

By FREDERICK HOBDAY, F.R.C.V.S., AND H. J. R. POPE, M.R.C.V.S.,
London.

THE patient was a mongrel terrier bitch, about four years old, which had never had puppies. Was brought by the owner on account of a protrusion from the vagina, which had existed for several days, and was now becoming soiled and offensive. It was clear, upon examination, that this consisted of the two horns of the uterus, which were fully two-thirds everted. Except for the local inconvenience the animal showed no constitutional disturbance, eating food and drinking as usual.

Amputation was decided upon, and this was done under anæsthetic and by the aid of a ligature. The ligature came away on the fourth day and recovery was quite uneventful.

A LARGE UTERINE FIBROID REMOVED PER VAGINAM.
BY FREDERICK HOBDAY, F.R.C.V.S., AND H. J. R. POPE, M.R.C.V.S.,
London.

THIS case is of unusual interest, partly because of the size and situation of the tumour, and partly because of its possibility of removal without opening the abdominal cavity.

The patient, a toy Pomeranian bitch, weighing about 6 lbs., five and a half years old, which had never had puppies, was brought to Mr. Pope on account of a swelling in the vagina, which was perceptibly growing, and was now the size of an ordinary walnut and visible through the vaginal orifice as a hard, white, shiny lump. It was beginning to cause inconvenience during urination, and occasionally a fœtid, purulent discharge took place. Digital examination revealed the fibromatous nature of the tumour, and clearly differentiated between this and an ordinary prolapse.

The diagnosis was clearly confirmed that it was a uterine fibroid involving the posterior part of the body of the uterus, and as it was too large to pass through the labiæ of the vulva of so small a patient, it was decided to incise the perinæum and to reach it from here. Under chloroform and all antiseptic precautions this was done, and after careful dissection and the subsequent use of a ligature, the whole of the fibroma was removed. The perineal wound was sutured and healed by primary union. The ends of the ligature were left protruding from the labiæ of the vagina, and this was removed on the third day.

Further progress was uneventful and the bitch made a complete recovery.

PARAPHIMOSIS IN A YORKSHIRE TERRIER AND HARD
SUBSTANCE IN A FOX TERRIER.

BY G. MAYALL, M.R.C.V.S.,
Bolton.

I.—A YORKSHIRE terrier, 18 months old, was brought to me on July 3 with his glans protruded half an inch and the prepuce tightened behind it. The glans was as big as a walnut in size, ingorged with blood, and of a pinkish hue. After lessening the size of it by placing swabs soaked in adrenalin and afterwards alum solution around it, manipulating it with the thumb and forefingers and afterwards pulling the sheath up over it rather than pressing it much down into the

sheath, I was able to return it and push it well home into the sheath by catching hold of the extremity of the prepuce and sliding it back inside. It took me about 20 minutes to complete the operation of reposition. I gave the dog a teaspoonful of liquid paraffin and sent a dose or two home with him.

There is little written in canine literature about the cause of paraphimosis. In this case the owner assured me that the dog had been kept in the house always and never been near a bitch. There appeared to be no paralysis of the penis, and I can only conclude that the dog had had an artificial erection which had resulted in the paraphimosis. There was no traumatism and no tumour of any kind present.

II.—A fox terrier dog rejoicing in the name of "Der Teufel" was brought to me on June 30 with a pronounced swelling below the right orbit and an infra-orbital fistula discharging dirty pus. I cleansed the region with antiseptic, and on manipulation found a movable hard substance the size of a pea beneath the skin. I cut down on to it and removed it, and it weighed six grains. The growth was well surrounded with soft tissues, and to get it out I had to use a tooth forceps. It communicated with the root of the first molar, and was evidently growing, as there were several free particles besides the pea-like structure that I removed. The dog has gone on well since, and the owner assured me that the fistula had been present for about three weeks before I operated. The substance may be an exostosis or an odontoma.

A MONOPHTHALMIC MONSTROSITY.

By MAX HENRY, B.V.Sc., M.R.C.V.S.,

Sydney, New South Wales.

THE subject of this note was a pure Merino lamb born recently on the Government Experiment Farm at Tranjie, N.S.W., and submitted for examination by the sheep overseer, Mr. Lindon. The lamb was born fully developed almost a month over time, and the head was markedly abnormal. The dimensions of what would in ordinary animals have been the face and top of the head were about $4\frac{1}{2}$ by 3 inches. The ears were normal, and midway between them and on a little higher level was placed the single eye, which was at birth apparently normal. The lower part of the face works apparently on a joint representing the maxillary articulation. The line of cleavage ran through the middle of the eye. At the bottom of the face there was an opening representing the mouth, and showing inside a normal palate formation. Hanging over this opening there was a small triangular pro-

boscis. On examining the under-surface, a rudimentary tongue was seen towards the anterior extremity, but was not in any way connected with the mouth. The whole head was covered with very hair-like wool.

AN INTERESTING KIDNEY CALCULUS IN A SHEEP.

By REGINALD W. HALL, M.R.C.V.S.,

Barry

THE presence of calculi in the kidneys of the sheep has not been observed very frequently and is therefore worth recording when met with. The specimen met with was taken from the left side of a fat three-year-old cross-bred Down ewe.

The structure of the kidney had completely disappeared, leaving only hard calcareous material, surrounded by remnants of the capsule.

The usual quantity of fat which generally surrounds a kidney was absent, and I could not discover any trace of the ureter.

The ewe was brought in to the abattoir, without any special history, amongst a bunch of others, and the abnormality was discovered whilst inspecting the meat.

The right kidney was enlarged, but, upon section, its structure appeared normal.

PERITONITIS IN YOUNG CATTLE.

By R. HUDSON, F.R.C.V.S.,

Retford.

DURING the spring and early summer, the country practitioner is frequently called upon to treat young cattle which are said to have "gone off" in condition since they were turned out to grass, and if winter keeping has been scarce, necessitating the turning out of cattle early, or the frosts late in the season, he will have more cases to advise upon.

When visiting a farm one day in May, I saw about twenty six-months' old calves turned out to grass and remarked to the owner that they were a splendid lot. A month later he came to me and asked me to go and see them. Two were dead and the remainder were wrecks of their former selves.

Two frosty nights soon after they were first allowed to remain out brought about the trouble in this case.

The majority of them looked very thin and empty; hair erect, losing its natural red colour, and taking on a yellowish tint; skin light, nose dry and dirty; grunting, eyes sunken and gouled; inside of ears

yellow and covered with greasy scaly deposit ; some scouring, others constipated, the fæces being partly covered with blood and mucous. They were feeding badly ; rumination was suspended ; they laid a lot and were not easily induced to rise. Temperature 102-103° ; pulse 60° ; thin and wiry. Post-mortem examination showed peritonitis and some enteritis.

The peritoneal cavity contained about a quart to two quarts of straw-coloured fluid. On the outside of the stomachs, particularly along the grooves between them, more patches of peritonitis and the peritoneal covering of the intestines also showed peritonitis along various lengths.

The inflammation did not always extend through the wall of the intestines, but here and there inflammation of the mucous membrane was found to exist.

The liver and kidneys were enlarged and the urine high in colour. Death appeared to be due to exhaustion, following the absorption of toxins, diarrhoea and pain.

Treating such cases almost amounts to what the owner described as "rearing them over again." They must be taken up and housed in a warm, well-bedded yard. If there are many, it is better to divide them up, putting the worst together. They should be encouraged to drink gruels of linseed and oatmeal, allowed to get cold before offering. If refused, oatmeal or bran stirred up in cold water and allowed to soak, may be tried. Sick animals often refuse boiled or scalded gruels when they will take them made with cold water, scalded bran, oatmeal, and hay chaf, linseed cake and any easily digested food, such as green clover or grass, though I do not think green food as good as scalded food, owing to its tendency to ferment and aggravate any diarrhoea which may be present.

Bad cases should be rugged down, and if heifers, a soft sack may be stitched right round the body.

Purgatives should be avoided, the bowels, if necessary, being assisted by injections. Ammon. carb., Pot. nit., soda bi-carb., are most useful, aided by nux-vomica in the later stages. In bad cases of diarrhoea, chlorodyne may be given, but with the checking of diarrhoea, what little tendency to feed there is, is often suppressed altogether.

If well nursed, many cases recover. If left out many waste away to skin and bone, having become chronic scourers, becoming invaded by parasitic worms, owing to their weakened vitality.

Although mostly met with in young stock, older cattle, particularly cows in milk, may be affected. As a rule they show more tendency

to grunt and the symptoms may be mistaken for those of stomach obstruction.

It is a great mistake to turn young stock out at night too early in the year, and any not doing satisfactorily should be brought up and helped by good bedding, food and protection at night.

PERICARDITIS IN LAMBS.

By J. MALCOLM ARMFIELD, M.R.C.V.S.

AN outbreak, causing alarming mortality in lambs in Wiltshire, came under my notice in the early summer of this year. It may be worthy of report, as several authorities of long experience could furnish little information, except that they had occasionally come across a similar condition, and text-books hardly mention it.

▲ The subjects attacked were lambs about half-grown, in good condition, and not noticeably ailing until 3-4 hours before death, when slight purgation was observed. They were hurdled on tares, and were also given a small ration consisting of aniseed cake, undecorticated cotton cake, maize and locust beans (not the best diet for lambs, one would think !).

About 20 deaths occurred in a fortnight in a flock of over 300, and then fatalities ceased, to the relief of all concerned. Examination of carcases revealed little else but jelly-like substance in the pericardial sac, and moderately extensive gastro-enteritis.

In one animal I opened I found a good many (about 200) specimens of the *trichocephalus affinis* worm. It would be interesting to know the exact cause of the condition, and what precautionary methods should be practised.

TWO ILLUSTRATIONS OF THE VALUE OF B.I.P.P. AS A WOUND DRESSING.

By FREDERICK HOBDAY, F.R.C.V.S.,

London.

BISMUTH iodoform paste has been strongly recommended on many occasions as a wound dressing, but has not yet received the attention it deserves in veterinary practice. Used with discretion in deep and serious wounds, it is a most valuable application, and if it can be made to penetrate the depths of a burrowing sinus, it will, in a high proportion of cases, effect a cure without the drastic use of the knife. It is easy of application, and has the advantage that when once it has been thoroughly applied it does not need to be renewed for several days, so that any little disadvantage it may have

on grounds of expense is compensated for by the time and trouble saved in dressings.

Amongst many cases of its utility I recollect two in particular which were typically illustrative.

One was a pack pony engaged on active service in Italy on the Asiago plateau, when a shell burst overhead, killing one animal and wounding twelve others. This particular pony received a piece of shrapnel directly downwards into the fleshy portion of the haunch, causing a narrow wound in which a probe could be passed to a depth of nine inches. The piece of shell could not be felt. Our common experience of these was that these cases invariably suppurated extensively, and that eventually the animal had to be killed. In this instance the wound was filled up with B.I.P.P. within an hour after infliction, and the pony was sent down to hospital. This was the only dressing done. I saw the animal nine days afterwards when there was no suppuration whatever, and the wound was only three inches deep. The piece of shell had now worked upwards within reach of a long pair of forceps, and was extracted. A fresh amount of B.I.P.P. was inserted, and recovery was uneventful. The second case was that of a wire-haired terrier dog with a vertical sinus some two inches deep just behind the left elbow. I wanted to lance it in the lower portion, but the owner was very much averse to the use of the knife, and in this instance the interior was dried out with cotton wool and then smeared over with B.I.P.P. every third day. Four dressings were used, and recovery was uneventful.

A word of warning must, however, be issued against using it too freely on wounds of the dog and cat, as each of these species of animal are susceptible to iodoform poisoning from absorption. At the slightest sign of loss of appetite or dullness, the dressing must be stopped, and the part thoroughly cleansed, another dressing being applied.

Abstracts.

CERVICITIS OR INFLAMMATION OF THE OS UTERI IN CATTLE.

By J. F. DE VINE, D.V.S.

THIS is a pathological condition which unfortunately has not received sufficient attention to make our knowledge as accurate as its seeming importance warrants. Until comparatively recently, most of the accepted theories as to the part cervicitis played in sterility have been quite erroneous; in fact, those who posed as being authorities

on animal industry practically ignored any pathological condition of the female genital organs other than atresia of the cervix, as having much to do with the problem of sterility, and this was equally true of our older text-books on veterinary obstetrics. Where animals failed to breed, the potency of the male was questioned, or the simple (?) process of "opening" the female at time of service was recommended. This accepted teaching has been harmful; aside from having no merit in most cases it not infrequently occasioned injury and infection of the cervix by crude manipulation, and also diverted attention from the real cause. Later this practice gave way somewhat to douching the vagina with an anti-acid, just before breeding. There is a possibility of this having some virtue. It is probably based on experiments that have been carried on in the human family in investigating sterility in some cases where it was found that the spermatozoa of certain males deposited in the vagina of certain females and coming in contact with the vaginal secretions perished either at once or in a short time, the resultant theory being that the secretions were too acid. However, this is not an entirely satisfactory explanation, as it was found that spermatozoa of another male when deposited in the vagina that was supposed to be excessively acid did not perish but lived several days in contact with the vaginal secretions. This theory was further complicated by the fact that the spermatozoa of the first male might remain active in contact with the vaginal secretions of another female, indicating a selective action rather than excessive acidity. This, of course, may explain why one animal may not conceive from any of several services of one male and conceive at once when served by another male. However, such a coincidence is not proof that the ovarian activity or the physiological condition of the cervix, uterus and tubes were not the determining factors, and that the last service occurred at just the proper time. However, douching with a slightly alkaline solution before breeding still seems to be an excusable custom, when all organs appear normal so far as can be determined.

From clinical experience, it is my opinion that cervicitis is one of the fairly common abnormal conditions of the female genitalia, particularly in bovines, accompanying and complicating in varying degrees of severity, practically every case of endometritis, metritis or retained placenta, not infrequently becoming chronic and causing sterility, or in the case of the pregnant animal, giving rise to a condition that may occasion the death of either the mother, the fetus, or both.

Notwithstanding this admission of the importance of cervicitis, I still believe it well to confine its discussion entirely to such informa-

tion as seems reasonably reliable rather than to consider plausible theories, since the latter might lead to errors rather than to the enhancement of our present knowledge.

If we compare the gross anatomy of the cervix of the mare and the cow it will be apparent at once that nature for some reason ordained a decided difference in the make-up of these two organs. In the mare we have a short, pliable cervix continuing anteriorly with the uterine body and posteriorly projecting into the vagina from one-and-a-half to two-and-a-half inches, normally, during the period when the internal genitals are in a state that might be styled dormant. During the period of estrum, not infrequently in the mare the cervix is completely obliterated, so to speak, and if one should make a manual examination at such a time the opening in the uterus would be found so dilated that the hand could be passed readily in, nothing but a fringe around the opening outlining the cervix. A somewhat similar condition also exists in some cases of chronic cervicitis in the cow. In what might be styled the ideally physiological condition of the cervix of the mare at the time of estrum, we find it soft, dilatable, and sufficiently dilated to admit one or two fingers readily through its opening. In this condition it is assumed that the glans penis of the male often grasps the external cervix and deposits the semen directly to the uterus.

As evidence of the apparent physiological advantage of a cervix of this character, experience has taught us that everything being equal, mares with such cervices conceive more readily and more regularly than those having widely dilated, constricted or indurated cervices. However, it is a debatable question whether or not this ideal cervix is not somewhat of an indicator of the physiological condition of the other internal genital organs, which in turn play a greater part in conception than the cervix itself. Let this be as it may it destroys the theories of the past, that "opening" the cervix is of any importance except in the rarest of cases, in the problem of relieving sterility, and this is as applicable to the mare as to the cow.

The vast difference in the conformation of the cervices of the mare and cow is at once apparent in the greater size and rigidity of the cervix of the cow. While the muscular walls of both are arranged in longitudinal and circular muscular fibres so as to contract or dilate at such times as nature intended, still the mare's cervix is short and so flexible that it can be readily dilated at almost any time; while in the cow the circular muscular fibres arrange themselves in rings so that a cervix may measure from three to five inches in length and the tissue be so dense and contracted that even at the time of estrum it is

rarely possible to pass a sound much larger than a lead pencil through the cervix, and it is almost impossible to dilate it to any material degree without cutting or tearing, excepting at the time of estrum or parturition. The mucosa of the cervix is thrown into deep longitudinal folds, admitting of great dilation at the time of parturition, and under inflammatory conditions may arrange themselves in ridges, or in a fluted condition complicating entrance into the uterus by even a small sound or probe.

The mucosa is liberally supplied with mucous glands throughout, and it seems as though one might be justified in supposing that this hard, tight, tortuous cervix of the cow so well supplied with apparently germicidal glands, might be the one least vulnerable to infection. This is evidently not the case, or our equine females have up to the present time, so far as we know, escaped the virulent specific type of infection that works so disastrously in the cervix of the cow. When once the infection penetrates past the barrier glands and becomes seated, so to speak, the cervical tissue seems too phlegmatic to readily throw off this deep-seated involvement.

Clinically we recognise two types of cervicitis—acute and chronic. True, these types vary in severity, but where a clinician should positively subdivide is beyond my power to determine or elucidate.

In acute cervicitis we have the cardinal symptoms of inflammation. This is plainly evident in cases that are associated with abortion or retained placenta, particularly those cases which are so acute as to cause the animal pain when the cervix is handled. It is generally known that the cervix of the cow like the human cervix has little feeling, and ordinarily can be handled and grasped with forceps and drawn back with practically no pain, but in the very acute type of cases frequently the cow will either arch her back, draw away, or strain violently with the slightest manipulation of the cervix. These cases might be styled the hemorrhoidal cases, since if the cervix is retracted to view, it will be noticed that it bleeds under pressure of the hands or forceps. Its mucous folds have the appearance of freshly chopped beef, varying in colour from deep red to purple. If a case of this type is seen a week or so after it might be difficult to recognise it as having been originally of this type. This may be so with or without treatment. The acute condition may have subsided so that while there is still more or less tendency to bleed from handling, the sensitiveness may have entirely disappeared and the handling cause no more pain than is usually occasioned. It is evident that some of these cases may recover spontaneously, the parts quite rapidly becoming apparently normal, but many of them not effectively treated be-

come chronic, with more or less induration and occasionally leading to artresia, but more often to a dilation of the cervix, varying from a condition that will admit the two fingers to a dilation that will admit the whole hand. Accompanying chronic cervicitis as a fairly constant symptom is an accumulation in the vagina and cervix of great quantities of clear mucous, such as is observable during the early hours of an estral period, or this may be displaced by a varying quantity of either a catharrhal exudate or a mucopurulent exudate, usually with pronounced evidence of more or less uterine mucosa involvement. This involvement is not infrequently so severe as to thicken the mucous membrane sufficiently to be plainly perceptible to the finger's touch.

Where the discharge is clear and there is no plain evidence of any severe involvement of the uterine tissue except the endocervix and the animal ovulates regularly, it would be interesting to know whether the dilation of the cervix or the character of the discharge is a more important factor in failure to conceive. To determine this would probably require much evidence, since when such cases are treated successfully there apparently is a simultaneous lessening of the discharge and contraction of the cervix. Some workers are of the opinion that cervicitis is frequently seen in the virgin; if so, I have rarely been able to diagnose it.

TREATMENT.

Up to the present I have directed my attention to trying to prevent the plainly acute cases that are associated with the abortion or retained placenta from becoming chronic, by irrigating with hot salt solution daily, beginning twenty-four hours after parturition and swabbing the cervix with Lugol's solution or iodine every two or three days, continuing the treatment as long as the individual case seems to warrant.

In chronic cases that have followed abortion and been neglected, I attempt to correct the trouble where it seems feasible, by swabbing the cervix with iodine or Lugol's solution every three or four days, occasionally packing some cases with gauze or cotton soaked in Lugol's solution and irrigating the uterus where it is evidently involved with Lugol's solution from one-half or two per cent., for a few times at irregular intervals, supplemented by irrigation with hot salt solution and massaging as often as it is practical to see the patient.

As to surgical treatment, I have not attempted any of the classic operations practiced in human surgery, confining my surgical interferences entirely to removing any folds or growths or abnormal conditions that are easily accessible and from their size and arrangement appear to be interfering with a free opening of the minute canal.

It is quite probable that skilled surgery in selected cases would relieve some of the conditions that are now regarded as hopeless, but substantial advancement in cervical surgery will need to be left to those so situated that failures during the experimental period will do the least harm to their professional standing and incidentally to their income.—*American Journal of Veterinary Service.*

DYSENTERY OF LAMBS.

By S. H. GAIGER, F.R.C.V.S.,

Principal, Glasgow Veterinary College.

DURING the summer of 1918, the writer was consulted by sheep farmers in regard to a disease commonly termed "White Scour" or "Red Scour," which was carrying off large numbers of lambs annually, and an arrangement was made to visit some of the affected areas the following spring, which is the season when the disease occurs. The following notes are based on the preliminary investigations which were then made.

In the spring of 1919 information was received that the disease had broken out amongst the new lambs in as virulent a form as in previous years, and accordingly one of the worst affected areas was visited, and a commencement made with the work of investigating the disease. At the same time a large number of personal enquiries and enquiries by letter were made in order to find out something of the distribution of the malady, the extent of the mortality, and general facts in connection with the occurrence of the disease.

Distribution.—The disease appears to be distributed over certain fairly wide localities in the south of Scotland and the north of England. It is present to a considerable extent in Dumfriesshire and Kirkcudbrightshire, and in Northumberland and Cumberland.

The disease does not seem to have appeared as yet in any part of Scotland north of a line between the Firths of Forth and Clyde.

Occurrence.—On Farm A, containing 1,200 acres of pasture land, the disease accounted for the deaths of 70 lambs in 1914. There was very little loss in 1915, when the present tenant took over the farm, but this tenant bought none of the late tenant's sheep. In 1916 and 1917 only a few lambs died. In 1918 there were 50 deaths, and in 1919 there were 97 deaths. In 1918, on this farm, the disease commenced eight or nine days after lambing began, so the farmer arranged for lambing to commence earlier in 1919. In 1919 the disease appeared in lambs from two days up to two weeks old, though

sometimes in those a little older. No lambs have been known to recover.

This farmer keeps Border Leicester and crossed stock, and, owing to the serious mortality, has contemplated giving up keeping sheep, but proposes to try fewer numbers for 1920. He has been amongst sheep for sixty years, and has never seen this disease before. In his neighbourhood it seems to be a recent disease, and is looked on as such a serious scourge that other sheep breeders are contemplating giving up sheep breeding.

On Farm B the disease was unknown four or five years ago. There were 50 deaths of young lambs in 1917, 80 deaths in 1918, and in 1919, out of a total of 500 lambs, 120 died.

This farmer reports that deaths from dysentery, in all his neighbourhood have been very heavy. His own losses have been so great that he intends to keep only half his stock of breeding ewes in future.

On Farm C there was no sign of this disease before the lambing season of 1919, when 30 lambs died. The disease did not appear before the lambing of the last 50 lambs of that season.

In this case the loss occurred only in one heft carrying seven score ewes, but this was alongside Farm D, which had a heavy loss. The two farms were divided by a good dyke.

On Farm D there is a stock of 1,550 blackface ewes divided into three hirsels of 630, 520, and 400.

Dysentery was never seen before the year 1919 on this farm, and then it appeared in the hirsle of 630, and 140 lambs died. The other two hirsels did not become infected.

On Farm E there is a stock of 30 score ewes. The disease first appeared in 1912. This farmer has no accurate record, but he considers his loss to be between 50 and 100 per annum. Others in this neighbourhood say the disease was present on this farm as early as 1907.

On Farm F the disease has been in existence since 1915, and the loss has been 100 lambs per annum. This farmer's experience is that the lambs die as quickly and not in any less numbers than when the trouble first began; in other words, the virulence of the disease and the mortality amongst the affected are both undiminished. The deaths cease here about the end of May.

On Farm G the disease made its first appearance about the end of April, 1912. In 1914 and 1915 the disease commenced on April 23.

The losses from dysentery on this farm were accurately recorded, and were as follows :—

1912	..	..	..	15 lambs.
1913	..	..	..	20 „
1914	..	..	..	100 „
1915	..	..	..	100 „
1916	..	..	..	80 „
1917	..	..	..	80 „
1918	..	..	..	30 „
1919	..	..	..	25 „

This farmer's experience is that the disease is practically always fatal, though there are rare exceptions, and that although the numbers of cases are now on the decline, these numbers include all the lambs. which are attacked. His view is that the virulence of the infection. does not decrease.

On Farm H the disease began in 1912. For the five years including 1919, the total loss has been 240 lambs, but the loss during the seasons 1918 and 1919 were by far the heaviest.

On Farm I, which has a stock of 27 score ewes, there is no record of when the disease commenced, but in 1917 there was a loss from dysentery of 100 lambs, in 1918 a loss of 120, and in 1919 a loss of 50 lambs.

On Farms J, K, L and M, losses to the extent of "a few" occurred both in 1918 and 1919.

A number of other farms in the neighbourhood of some of those mentioned above are known to have had this disease, but it was not found possible to get any information.

The farms of which information is available do not, to the writer's own knowledge, give anything like a true indication of the entire extent to which this disease has taken hold.

While visiting some of the infected districts, a considerable number of enquiries in regard to the disease were made. Information was, at times, almost thrust upon one, as the "lamb disease" was the talk of all the farming community in those districts. The disease is commonly known to farmers in the north of England, and mentioned in the newspapers as the "mysterious affection of lambs." In certain parts of the south of Scotland the trouble is looked upon by the shepherds as a form of louping-ill.

Symptoms.—Dysentery affects lambs up to about a fortnight old. It is seldom that lambs of a few weeks old are affected.

The trouble may be very quickly fatal, and the lamb which was bright and lively one day may be found dead the next.

In most cases the trouble does not terminate so quickly in death, but from the time a lamb is seen to be ill it is only a matter of twenty-four hours or so till death occurs. The symptoms exhibited are dullness, and the lamb not following the ewe. A yellow scour is seen to be present, and the fæces are frequently tinged with blood. If the lamb lives long enough, this changes to a black scour. The lamb quickly develops symptoms of intoxication and prostration.

In very rare instances a lamb has shown symptoms for as long a period as seven days and then died, but this is quite exceptional.

Post-mortem Lesions.—The post-mortem lesions in dysentery, as in all sheep diseases, differ considerably in an animal which has been “found dead” and in one which has been destroyed at the height of the symptoms. Putrefaction in sheep, and especially in cases where the disease is abdominal, comes on with very great rapidity. There are probably several reasons for this. The temperature of a sick sheep is comparatively high, say 106° F., and this temperature does not fall as rapidly as in other species of animals because the woolly coat is a bad conductor of heat. The conditions of moisture, combined with a suitable temperature, are very favourable for the growth of putrefactive bacteria invading the body tissues from the bowel after death. Another reason for early putrefaction in sheep is that the wall of the sheep’s bowel seems to be, comparatively speaking, very readily permeable by the common intestinal bacteria. While working upon another sheep disease abroad, the writer found that these common intestinal bacteria can penetrate the bowel-wall even *before* death. Sick lambs which would not be expected to die for a few hours, were found to have these bacteria in the peritoneal fluid, though not in the organs. This shows that sick sheep actually commence to putrefy before death takes place. Not many hours after death, these bacteria are found to have penetrated to the remote regions of the body.

I have dwelt upon this point in order to emphasise the danger there is from the very outset of falling into an error in the investigation of sheep diseases. From the outset the writer decided to have nothing to do with dysentery lambs “found dead” beyond making a simple post-mortem examination.

Fortunately, an opportunity arose to carry out preliminary pathological and bacteriological work on three cases found alive, two of these being very typical cases. Each case was a pronounced one, but none of them was in extremis. Lamb 1 differed from lambs 2 and 3 in that it was one of the more chronic cases, and was killed for the above-mentioned work on the eighth day of disease. Lambs 2 and 3 were killed for examination on the first day of disease.

The peritoneal fluid was slightly cloudy in lamb 3, but clear in the other two. In all there was severe inflammation of the large bowel, and scattered here and there were small circular necrotic areas of the size of a lentil. These areas were bright yellow in the centre, and had a bright red circumference, due to inflammatory phenomena limiting the areas of necrosis. These lesions could be easily seen through the wall of the bowel before the bowel was opened, but they were more distinct after slitting open the bowel and washing the surface gently. Some of these areas seemed on the point of breaking down into a perforation of the bowel, though actual perforation was not seen.

The small intestines were almost normal. In places they showed a certain amount of injection of the blood-vessels. In no part of them were the necrotic areas found. The stomachs were normal in each compartment. The lymphatic glands in the abdomen were enlarged and oedematous. The liver was enlarged and softened and lighter in colour than normal. The kidneys were inflamed and slightly enlarged in lambs 2 and 3, and distinctly enlarged in lamb 1. The spleen in lamb 1 was very much enlarged. The heart, lungs and chest cavity in each case were normal.

The probable causal bacterium.—From all three lambs cultures were made upon a variety of media, and from all the organs and tissues of the body. The result was that from all three lambs the same bacterium was obtained in pure culture.

This bacterium was present in the liver, the glands of the abdomen, the kidneys, and the urine.

The blood, spleen, lungs, peritoneal fluid, and the pleural fluid were sterile in each case in so far as cultural methods showed.

The organism grown was a short bacillus, and at first it was thought that it was of the colon type, a type of bacterium which is the cause of certain scours in calves. Further study showed that the organism is unlike any hitherto described variety of the *Bacillus coli*.

On Agar slopes the bacillus shows colonies indistinguishable by the naked eye from colonies of typical *Bacillus coli*.

On bouillon there is turbidity which quickly settles to the bottom of the tube. There is a distinct surface scum.

Gelatine is not liquified.

Fermentation of the following sugars took place : Glucose, Lactose, Saccharose, Mannite, and Dulcite.

No fermentation occurred in the following : Adonite, Inosite, and Inulin.

In Litmus-milk acid and clot were formed.

It is negative to the Voges and Proskauer reaction.

The bacillus is non-motile.

In its fermentation reaction, therefore, this bacillus falls under Group 3 in MacConkey's classification of the varieties of the *Bacillus coli*, of which *B. Friedlander* is the Group type.

Pathogenicity.—Young rabbits of a few weeks old die in from 24 to 48 hours after subcutaneous inoculation of 1 cc. bouillon culture.

Rabbits over three months old are less susceptible. Some die in about 48 hours, but most are made ill and recover after a few days. These always develop a local lesion about the size of a two-shilling piece which bursts, discharges, and heals up in two or three weeks.

Rabbits in which the disease proves fatal develop a severe scour. On post-mortem examination there is seen severe inflammation of the intestines and lesions similar to the necrotic lesions seen in natural cases in lambs. The bacillus is recoverable in every case from the liver.

In rabbits a fatal termination is more likely to ensue after intraperitoneal inoculation, but adults are not necessarily killed by this method.

Young guinea-pigs are less susceptible to subcutaneous inoculation, and the animal shows no ill-effects beyond the local lesion which, as in the rabbits, bursts, discharges and heals. On older guinea-pigs the result is the same.

A pigeon inoculated intramuscularly with 2 cc. bouillon culture became seriously ill and died on the fifth day from the inoculation. On post-mortem examination there was seen a certain amount of muscle necrosis and a very severe enteritis.

A horse received an inoculation subcutaneously of 2 cc. bouillon culture, and a local abscess resulted, which healed up within a fortnight.

It was not found possible in the spring of 1919 to do any experimental inoculations on lambs to test the pathogenicity of the bacillus. This, of course, must be done at the earliest opportunity, as being one of the crucial tests as to whether this is the causal organism or not. Later in the year a hog was fed with a very large dose of bouillon culture (200 cc.), but it had no visible effect. Subcutaneous inoculation of a hog produced considerable persistent local inflammation, but no abscess.

Filtrate (toxin) from a three-day-old bouillon culture was inoculated into a rabbit, guinea-pig, and horse, and did not produce any abscess, but merely a quickly-disappearing local swelling.

After culture for five months in the laboratory without passage through rabbits, the bacillus was found to have lost some of its virulence for rabbits. It would not kill young rabbits on subcutaneous

inoculation, but it was found that its virulence could be restored by intraperitoneal inoculation, up to the point where subcutaneous inoculation proved fatal for young rabbits.

Is this Bacillus the Cause of the Disease?—From the small amount of work done, one cannot say with certainty that this bacillus is the causal organism of dysentery in lambs. It would appear to be highly probable that it is so, however.

The bacillus was present in all three cases. It was present before death in regions of the body, where it is most unlikely to have been a harmless invader, and it was there a number of hours before one would have expected death to occur. It is an organism which has marked pathogenic properties on inoculation into animals, and in young rabbits sets up a fatal enteritis with lesions in the bowel resembling those seen in lambs.

Sections through the ulcers in the bowel in lambs and rabbits show that the wall of the bowel, as far as its peritoneal surface, is invaded by a short bacillus described above.

The rate of spread and the nature of the disease in lambs are not such as would lead one to suspect the cause to be an ultra-visible virus.

It is therefore considered probable that this bacillus, found associated with the disease, may be the actual existing cause, but further experimental work and tests must be done to confirm this.

There are difficulties in the way of an extended investigation into the disease, because it occurs during only about three weeks in the year, or at most a month, in any one flock. This seasonal character is doubtless due to the disease attacking only lambs up to about three weeks old, and then the disease disappears because the lambs get beyond the susceptible age. Last year when I found it possible to visit the disease areas, the disease had been in progress nearly two weeks, so that there was only about one week remaining in which to do any investigation.

Prevention.—Owing to the serious state of affairs in the affected areas, it was decided to try and prepare an effective antiserum on a small scale for experimental use on lambs in the spring of 1920, as soon as they are born.

This is being done, though it is by no means certain that the serum will be of sufficient potency to be effective. The one horse used for this purpose was started on September 1, 1919, but considerable trouble was caused for a time by the local lesions when inoculations with live cultures were given, and in consequence the work was unavoidably delayed.

Lack of assistance and funds prevented me experimenting in making an antiserum on more than one horse.

Lamb dysentery is essentially a disease for which it is highly probable that an effective antiserum could be prepared, which might be the means of saving a great number of lambs' lives.

The serum would have to be inoculated as soon after birth as possible. It would have to be done on batches of lambs during lambing time, and there should be no difficulty in the shepherd doing the inoculations himself. It would hardly be worth a veterinary practitioner's while to pay frequent visits for this purpose. There would be no danger to the lambs from serum inoculation, and a single dose inoculated soon after birth ought to give immunity to the lamb lasting more than a fortnight, by which time the lamb would be beyond the age at which it is susceptible to the disease.

The cost of inoculating all the lambs on an infected farm annually would be infinitesimal when compared with the total sum lost annually by the deaths of lambs from dysentery on that farm.—*The Scottish Journal of Agriculture.*

THE OPEN FORMS OF TUBERCULOSIS IN DOMESTIC CARNIVORA.

By G. PETIT.

AFTER mentioning the works of Professor Cadiot on external tuberculosis of the dog and cat, and his views on establishing the identity of human tuberculosis with that of domestic carnivora, the author surveys the four-fold method of bacillary spread and pollution of the family *milieu* by open tuberculosis of carnivora and man.

1. Open tuberculosis of the pelvis of the kidney, tuberculous pyelo-nephritis; quite rare lesions which permanently throw out bacilli in the urine.
2. Ulcerous tuberculosis of the intestine: intestinal ulcerations, enteritis and tuberculous diarrhoea resulting in the pollution of the environment by excreta.
3. Cavernous tuberculosis of the lungs. Carnivora do not spit, but by their cough they throw out mucus charged with bacilli, which gain access to the lungs of people in contact with them.
4. Ulcerous tuberculosis of the skin. Frequent lesions in the dog and cat, and in which the pus swarms with bacilli, which is a great danger to children who play with these animals.

Conclusions.—Human tuberculosis is easily transmitted to the dog and cat, and it must be admitted and feared that tuberculosis of these animals is transmissible to man. We must not exaggerate or

disregard the real danger resulting from open or ulcerous forms of tuberculosis in the domestic carnivora. It is proper to consider as suspect dogs and cats whose general condition is bad, that are thin, cough, have diarrhoea, or are subjects of ulcers of the face or neck that refuse to heal.

Rev. Gén. de Méd. Vét.

POTASSIUM IODIDE IN MALNUTRITION OF PIGS.

By J. J. FREY,

Veterinary Pathologist, Division of Animal Industry, Sacramento, Calif.

EARLY in the fall, the owner of a herd of hogs in the foothill district of the Sacramento Valley, reported a disease among his suckling pigs, which he described as follows:—

When about three days old, scalded-like areas appeared around the mouth, on face and ears. These did not penetrate the skin, nor resemble the lesions of necrobacillosis. There was a distinctly noticeable enlargement in region of the thyroids. While retaining a good appetite, they became emaciated, the skin developed a scurvy-like surface, was wrinkled all over the body, and was hard to the touch. These symptoms progressed with increasing weakness, until the pigs finally lay on their sides, unable to rise, and died in the course of a couple of days more.

About fifty pigs all belonging to six sows, that had farrowed about the same time, were affected without an exception. The course of the disease appeared to be from two to six weeks. The mothers remained healthy, as did all the other hogs of various ages on the place. There was no history of cholera in the vicinity. The affected pigs retained clear eyes; there was no reddish discoloration of the skin, nor were the typical internal lesions of cholera present.

The condition suggested some form of malnutrition, and called to mind the article by E. B. Hart and H. Steenbock, of Wisconsin Laboratory of Agricultural Chemistry, on Thyroid Hyperplasia and Relation of Iodine to the Hairless Pig Malady in the *Journal of Biological Chemistry*, February, 1919, and a succeeding article in the *Journal of the A.V.M.A.* by Howard Welsh, of Bozeman, Montana, in which he stated that iodine is a specific prevention for hairless pigs and goitre in lambs and calves.

Accordingly it was advised that about two grams of potassium iodide be dissolved in water and mixed with mash and fed to the sows and litters daily.

The owner reported that 21 head were lost until time of treatment,

when almost immediate improvement was noticed and continued until the situation was entirely cleared.

This report is submitted as a corroboration of the articles above mentioned.—*Journal of the American Veterinary Medical Association.*

Parliamentary.

MILK AND DAIRIES BILL.

MEMORANDUM.

The Bill is designed to secure amendments in the machinery provided by the Milk and Dairies (Consolidation) Act of 1915—the operation of which is at present suspended—for securing improvements in the quality of the milk supply.

The main provisions of the Bill are as follows :—

- (i) Provision for the licensing of dairymen and dairies (clause 1).
- (ii) An extension of the provisions of the Principal Act in regard to the classification of milk (clause 2).
- (iii) Provision for the undertaking by sanitary authorities, with the approval of the Minister of Health, of the supply and distribution of milk, or the cleansing, storage, etc. of milk for sale by dealers (clause 6).
- (iv) The constitution of Milk and Dairies Committees by the local authorities who will administer the Act (clause 7).

ARRANGEMENT OF CLAUSES.

Clause.

- 1. Licensing of dairymen and dairies.
- 2. Amendment of section 1 (1) (l) of principal Act.
- 3. Additional powers.
- 4. Amendment of section 3 of the principal Act.
- 5. Amendment of section 10 of the principal Act.
- 6. Power of sanitary authorities with respect to supply and distribution of milk.
- 7. Milk and dairies committees.
- 8. Provision as to London.
- 9. Minor amendments.
- 10. Short title and printing.

SCHEDULE.

A BILL TO AMEND THE MILK AND DAIRIES (CONSOLIDATED)
ACT, 1915.

Be it enacted by the King's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same as follows :—

1. Milk and dairies orders made under section one of the Milk and Dairies (Consolidation) Act, 1915 (in this Act referred to as the principal Act), may provide for the licensing of dairymen and of dairies, and accordingly that section shall be amended as follows :—

The following paragraphs shall be substituted for paragraphs (a) and (b) of subsection (1) :—

(a) for the licensing of dairymen by local authorities, and for prohibiting the carrying on of the trade of dairyman by any unlicensed person, or by a licensed person otherwise than in accordance with the conditions (if any) attached to the licence ;

“ (b) for the licensing of dairies by local authorities, and for prohibiting the use as a dairy of premises which are not licensed, or of premises which are licensed otherwise than in accordance with the conditions (if any) attached to the licence.”

The following subsection shall be added after subsection (2) :—

“ (2A) A Milk and Dairies Order with respect to the licensing of dairymen or dairies may prescribe the circumstances in and the conditions under or subject to which licences may be issued, renewed, suspended, or revoked, and the fees to be paid on the issue and renewal thereof, and shall confer a right of appeal to a court of summary jurisdiction on any person aggrieved by a decision of a local authority refusing to grant or renew, suspending or revoking a licence.”

2. For paragraph (b) of subsection (1) of section one of the principal Act the following paragraph shall be substituted :—

(b) for authorising the use in connection with the sale of milk of the designation “ certified milk,” and for authorising or requiring the use in such connection of such other designation or declaration as may be prescribed by the order, for prescribing the conditions subject to which milk may or is to be sold under any such designation or with any such declaration, and for prohibiting the use of designations or declarations so authorised in connection with the sale of milk in respect of which the prescribed conditions are not complied with,

and for applying, with the necessary modifications, to designations and declarations so authorised the provisions of the Merchandise Marks Act, 1887, with respect to trade descriptions.

3.—(1) The following paragraph shall be inserted after paragraph (b) of subsection (1) of section one of the principal Act :—

“ (bb) for requiring any dairyman to keep such records and to supply to the Minister of Health or to any local authority such information and particulars as to the production, purchase, treatment, storage, cleansing, and sale of milk and milk products by such dairyman as may be prescribed by the order.”

(2) The following paragraph shall be inserted after paragraph (k) of subsection (1) of section one of the principal Act :—

“ (kk) for requiring milk to be treated by such process or processes as may be prescribed by the order.”

(3) The following shall be added at the end of subsection (2) of the same section :—

“ and may authorise or require any such person to carry out such tests for tuberculosis or other diseases as may be prescribed by the order.”

4. The following subsection shall be substituted for subsection (4) of section three of the principal Act :—

“ (4) The Minister of Health may by order direct that the sanitary authority for any area within a county shall exercise and perform in the area the powers and duties of the county council under this and the next succeeding section ; and where such order has been made with respect to any sanitary authority this and the next succeeding section shall apply as if the area were a county borough and the sanitary authority were the council thereof.”

5. The following subsection shall be added at the end of section ten of the principal Act :—

“ (3) It shall, if the Minister of Health so requires, be a condition of the appointment or employment of a veterinary inspector that he shall not engage in private practice, and any such requirement may extend either generally to all cases or to any particular cases or classes of cases.”

6. The following section shall be substituted for section twelve of the principal Act :—

“ (1) Subject to the approval of the Minister of Health and to such conditions as he may impose a sanitary authority may make

arrangements for securing the better supply and distribution of milk within their area and for that purpose may do all or any of the following things, that is to say :—

- (a) purchase milk and sell such milk within their area ;
- (b) make milk products from surplus milk purchased by them and sell such products ;
- (c) distribute milk within their area and store, cool, clean, and otherwise treat milk intended for sale in their area ;
- (d) exercise any of the powers aforesaid through the agency of any organisation approved by them ;
- (e) do all such acts or things as may be necessary or expedient for the purposes aforesaid or incidental thereto, including the acquisition by agreement of existing undertakings, but not including the production of milk ;
- (f) with the consent of any other sanitary authority exercise any of the powers aforesaid for the purpose of the sale of milk in the area of such other authority."

" (2) Every sanitary authority proposing to exercise powers under this section shall submit for the approval of the Minister of Health a scheme setting out the arrangements proposed to be made, and shall supply the Minister with such estimates and other particulars as he may require ; and the Minister may in his discretion approve or disapprove the scheme, and where he approves such scheme he may do so with such limitations, modifications or conditions as he thinks fit, but the Minister shall not approve a scheme unless satisfied that the scheme makes provision for securing that the charges to be made by the sanitary authority for milk and milk products supplied by them shall be such as may reasonably be expected to cover all costs incurred by the sanitary authority in respect of the undertaking, including charges in respect of loans and expenses of administration, and for securing that the accounts of the undertaking shall be kept separate from all other accounts of the authority, and shall be in such form and certified in such manner as the Ministry may require."

" (3) Two or more sanitary authorities under this section may combine for the purpose of establishing a common undertaking for the supply and distribution of milk in their several areas, or any parts thereof, and any scheme submitted by them under subsection (2) of this section shall contain the necessary provisions for the purpose, and those provisions shall have effect as if contained in a Provisional Order made under section two hundred and seventy-nine of the Public Health Act, 1875."

7. The following subsection shall be substituted for subsection (2) of section fifteen of the principal Act :—

“(2) Every county council shall, and any other local authority may, and if required by the Minister of Health shall, establish a committee (to be called the milk and dairies committee) constituted in accordance with a scheme made by the council and approved by the Minister of Health after consultation with the Minister of Agriculture and Fisheries.

“The scheme shall provide that one-third of the members of the committee shall be members of or elected by any agricultural committee appointed by a local authority having jurisdiction in the area or otherwise representative of the interests of agriculture, and may provide for the appointment as members of the committee of persons who are not members of the council.

“All matters relating to the exercise of the powers of the council under this Act (except the power of raising a rate or borrowing money) shall stand referred to the committee, and the council may also delegate to the committee, with or without restrictions or conditions as they think fit, any of their powers under this Act except the power of raising a rate or of borrowing money.

“Notwithstanding anything in section seventy-one of the Housing, Town Planning, etc. Act, 1909, or section seven of the Ministry of Agriculture and Fisheries Act, 1919, it shall not be necessary to refer to any committee constituted under either of these provisions any matter relating to the administration of this Act.”

8. (1)—For subsections (3) and (4) of section twenty of the principal Act the following subsections shall be substituted :—

“(3) A milk and dairies order affecting London shall provide for the exercise and performance by sanitary authorities in London of all powers and duties under the Order which relate to the retail sale and distribution of milk and to dairies used for the purpose of such sale and distribution.

“(4) As from the date when a Milk and Dairies Order providing for the licensing of dairies and dairymen in London comes into force the following enactments shall be repealed, that is to say :—

“(a) Section twenty of the Public Health (London) Act, 1981, so far as it related to dairymen, cowhouses, and places for keeping cows.

“(b) Subsection (4) of section six of the London Government Act, 1899, so far as it relates to dairies and milk.

“(c) Section five of the London County Council (General Powers) Act, 1908.”

(2) At the end of the same section the following subsection shall be inserted :—

“(7) The powers conferred by this Act on sanitary authorities with respect to the supply and distribution of milk shall in London be exercisable by the London County Council instead of by the sanitary authority :

“ Provided that where the county council have not undertaken the retail supply and distribution of milk in any area in the county it shall be lawful for the sanitary authority for that area to undertake such supply and distribution and matters incidental thereto (including the cooling, cleansing and other treatment of such milk), and the Minister of Health in approving of any scheme submitted for the purpose by the sanitary authority may require that if at any subsequent time the county council undertakes the supply and distribution of milk within the area, the undertaking of the sanitary authority shall, if so directed by the Minister, be transferred to the county council on such terms as may be agreed on or, in default of agreement, as may be determined by the Minister.”

9. The principal Act shall have effect subject to the minor amendments thereof set forth in the Schedule to this Act.

10.—(1) This Act may be cited as the Milk and Dairies Act, 1920,* and the principal Act and this Act may be cited together as the Milk and Dairies Acts, 1915 and 1920.

(2) Where any enactment or words is or are directed by this Act to be substituted in the principal Act for any other enactment or words, or to be added to, or omitted from, the principal Act, then all copies of the principal Act printed after such direction takes effect shall be printed with the said enactment or words added to the said Act or omitted therefrom, or printed therein, in lieu of any enactment or words for which the same is or are substituted, according as such direction requires, and with the sections and subsections numbered in accordance with such direction ; and the said Act shall be construed as if it had been enacted with such addition, omission, or substitution.

SCHEDULE.

MINOR AMENDMENTS OF PRINCIPAL ACT.

In the proviso to subsection (5) of section eighteen of the principal Act, “ a sanitary authority ” shall be substituted for “ the council of a non-county borough,” “ the area of the authority,” shall be substituted for “ the borough,” “ such area ” shall be substituted for “ such bor-

ough," and "sanitary authority" shall be substituted for "council thereof."

In the definition of "dairy" in subsection (1) of section nineteen of the principal Act, "kept, used, or treated" shall be substituted for "kept or used," and the words from "a shop from" to "the shop or" shall be omitted.

"Minister of Health" shall be substituted for "Local Government Board," and "Minister of Agriculture and Fisheries" for "Board of Agriculture and Fisheries," wherever those expressions occur in the principal Act; and where, in consequence of such substitution, it is necessary to substitute words in the singular for words in the plural, such substitution shall be made.

Obituary.

THE LATE DR. JOSEPH HUGHES, M.R.C.V.S.

A GRADUATE of the Glasgow College who "made good" in America, and whose memory will not readily be forgotten as one of those who materially helped to establish veterinary teaching on a sound basis at a time when it was at a somewhat low ebb, has recently died in Chicago. Qualifying as M.R.C.V.S. in 1880, Joseph Hughes held a municipal appointment in Dublin for two years and then crossed the Atlantic to settle in Chicago, in 1882.

In 1883, in conjunction with two American veterinarians, he founded the Chicago Veterinary College, himself acting as secretary. As a member of the teaching staff, he undertook the lectureship in several subjects, specialising particularly in the practical side, especially certain surgical operations, of which he made a speciality, and the diagnosis of lameness, in which he had few equals.

A regular contributor to the Proceedings of the American Veterinary Medical Association, and a regular attendant at its meetings, his opinion in all matters relating to the progress of the profession was always listened to with respect. By his death the profession in America loses an earnest worker, and the Royal College of Veterinary Surgeons loses one of its sons of whose name it is proud. Over 2,000 graduates have, in the Chicago College, owed their allegiance, at one time or other, to his teaching, and the prosperity of this Institution has been largely due to his energy and work.



THE LATE DR. JOSEPH HUGHES, M.R.C.V.S.,
Founder of the Chicago Veterinary College, U.S.A.

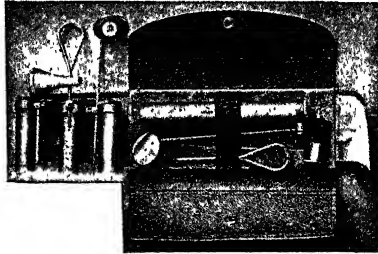
New Instruments and Appliances.

THE AURORASCOPE.

THIS very efficient little instrument is one of the most useful which has ever been put before the profession for the examination of the ear, throat, vagina, or, indeed, any of the semi-closed cavities of the body; and it is also very useful for the examination of the eye.

It consists of an electrical torch with a side attachment for the fixation of a lens or a mirror on the one side and an aural speculum on the other.

With it even the veriest amateur can readily examine the depths of the ear of the horse, dog or the cat without the slightest objection



on the part of the animal; and the vagina can be illuminated to show the slightest suspicion of venereal growth.

In the mouth the mirror can be used in such a way that the back of the throat and the reverse sides of the teeth can be fully illuminated and examined.

The inventor, Dr. Dutch, M.D., is a throat specialist well known in London, and the manufacture of the instrument has been placed with the Auroroscope Company, Fulwood House, High Holborn, London, W.C. The whole is fitted in a neat case which is sufficiently handy and portable to go in the coat pocket.

Personal.

OUR distinguished Belgian colleague, Professor Lienaux, has recently been presented with the high decoration of Officer of the Order of Leopold. He has also been elected, together with an equally distinguished colleague, Professor Hendriks, as a Member of the Royal Academy of Medicine of Belgium.

Colonel C. F. Morse, Director of the Army Veterinary Corps of the United States, has been awarded the Distinguished Service Medal for exceptionally meritorious and distinguished service during the recent war. The Surgeon General, in recommending this award, states :—

“ This officer was largely instrumental in building up a veterinary service during the war from practically nothing to 2,180 officers and 20,000 enlisted men and upon him devolved the care and treatment of the sick and wounded arising among 465,000 animals. Aside from the obligations to be met in home territory he was responsible for the organisation and dispatch overseas of all veterinary personnel and material required there. Believing that suitable recognition should be accorded the officer in home territory who not only made the overseas achievements possible, but also successfully overcame a task of great magnitude here, and as final evidence of appreciation of the splendid services rendered by the veterinary profession of America during the World War, I recommend that this paper be given earnest and favourable consideration.”

At the re-opening ceremony of the University of Strasbourg, the veterinary profession was represented by Professor Vallée, the Director of the Alfort (Paris) School.

In Denmark the total number of veterinary practitioners is 779, whilst for Norway there are only 243.

Dr. Addison, the Minister of Health, has appointed the following Committee in connection with the slaughter of animals and the distribution of food for human consumption in England and Wales :— Sir H. C. Monro, K.C.B. ; Mr. W. G. R. Boys, O.B.E.; Mr. R. B. Cross, O.B.E.; Mr. J. Edwards, Dr. W. J. Howarth, C.B.E., M.D.; Mr. A. W. J. MacFadden, C.B., M.B.; Mr. T. Masheter, J.P.; Mr. A. W. Munro, C.B.; Mr. T. Parker, F.R.C.V.S.; Mr. R. J. Robinson, Mr. P. Taylor, “ To be a Committee to consider and report on the legislative and administrative measures necessary to secure adequate protection for the health of the people in connection with the slaughter of animals and distribution of meat for human consumption in England and Wales.” It will be noted that the Veterinary Representative is present in the name of Mr. T. Parker, F.R.C.V.S., the Veterinary Inspector to the Borough of Newcastle-on-Tyne.

We regret to note that, owing to ill-health, Mr. Wallis Hoare, F.R.C.V.S., has been compelled to resign the Editorship of our con-

temporary, the *Veterinary News*. His place is being taken by Mr. Henry Gray, M.R.C.V.S., to whom we extend the hand of welcome as an able colleague, one who has the welfare of the profession at heart, and who will undoubtedly speak his mind on current events connected with veterinary affairs, political and scientific.

Old students of the Royal Veterinary College, London, will wish their old teacher Professor Shore, M.R.C.S., L.R.C.P., F.R.C.V.S., a well-earned rest on his retirement from the chair of anatomy after 43 years of active teaching. All will wish him well, and a great number will look back with gratitude to acts of personal kindness extended to them both inside and outside the College gates. Of friends he has made many and enemies none, and his readiness to help under all circumstances was proverbial.

The College, too, is losing Professor Larnder, D.Sc., who has occupied the Chair of Chemistry for 17 years, and he, too, will take away with him the good wishes of many students. His work on Toxicology and the book which he has written on this subject have made his name well known to the members of the profession in England, many of whom will still like to avail themselves of his skill and experience.

PUBLISHER'S NOTICE.

Owing to the recent further increase in the cost of printing and paper, we are reluctantly compelled to advance the price of the VETERINARY JOURNAL from 1s. 6d. to 2s. per copy. The Annual Subscription will be 21s., post free, instead of 18s., and the annual combined subscription with the VETERINARY NEWS will be 32s., post free. These revised rates to take effect as from July 1, 1920.

No increased charge will be made for subscriptions already paid to the end of the current year.

NOTICES.

All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C.2. Telephone: Gerrard 4646. Telegrams: "Baillière Rand, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editor.

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Illustrations for reproduction should be in good black or dark brown ink on white paper or card.

Advertisements and all business matters relating to the JOURNAL should be addressed to the publishers, Messrs. Baillière, Tindall and Cox.

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THE VETERINARY JOURNAL

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Sub-Editor :

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AUGUST, 1920.

Editorials.

A REJUVENATED NATIONAL VETERINARY ASSOCIATION.

If the recent meeting of the National Veterinary Association can be taken as any criterion of future work, it may at last safely be surmised that its officials have awakened to the needs of the profession and to the value which can be made of the Association in supplying those needs. The Association has been asleep far too long, and therein has lain, to a very great extent, the want of support from the profession, as evinced by its miserably small membership roll. To merely meet once a year, and even then to take no active part in the advancement of the everyday affairs of the professional body, was not doing "the greatest good for the greatest number," and the affiliation unto itself of the various local veterinary societies marks a new era which should be beneficial to the latter and reflect credit upon the parent Society, if only the scheme is taken advantage of.

Matters of professional import, sent forward by one or more societies, will be considered by the whole Council of the National summoned for the purpose ; and their support, if accorded, representing such a large proportion of the profession, cannot but strengthen the hands of the Council of the Royal College in any measures they bring before Parliament or other public bodies.

Such important matters as the recent Veterinary Surgeons' Act Amendment Bill, the Animals Anæsthetics Bill, and those which are now being dealt with by the Ministry of Food, the present Milk and Dairies Bill, the Meat Inspection question, and a hundred and one others, are all matters which concern the profession as a whole, and, therefore, should have universal consideration amongst its members. Matters of vital importance should be discussed by every branch society or group of societies, and resolutions should then be forwarded for the further consideration of the Council of the National, who, in their turn, should pass on their decision to the Council of the Royal College. In this way we should get the collective vote and support of the whole profession, a consideration no public body could afford to ignore.

PRACTICAL DEMONSTRATIONS AT VETERINARY MEETINGS.

THE value of practical demonstrations, and the appreciation by the members of this form of instruction, has for many years been insisted upon in the Editorial columns of *THE VETERINARY JOURNAL*, and no better evidence of its value can be deduced than the two recent enthusiastic meetings of the National Veterinary Association at Edinburgh and the meeting of the Royal Counties Veterinary Medical Association at the Army Veterinary School, Aldershot. On each occasion a number of operations and practical demonstrations of equal interest both to the general practitioner and to those engaged in microscopical work or other special branches of the profession were provided, the programme being carried out by experts in each particular branch. Enthusiasm prevailed everywhere, and there was not a dull moment from start to finish. If only those amongst ourselves who are inclined to "run down" our profession would take the trouble to support such gatherings with their presence and our societies with their subscriptions there would be less inclination to belittle our profession and to recognise the value of the scientifically trained man—indeed, to go further, and recognise that the properly trained veterinarian is as necessary to the well-being of every country where animals exist, not only for their benefit, but also because of the intimate relations, in so many instances, between the diseases of animals and the diseases of man.

DRUG CONTROL.

No veterinary surgeon can be in practice long without coming to the conclusion that many of his patients have been wrongly treated by drugging before his arrival on the scene, and in not a few cases animals are killed by constantly drugging for complaints which have been wrongly diagnosed or never existed. Canine patients probably get the largest share, and "worms" are the most frequent fairy tale, whilst treatment for loss of appetite in both horses and dogs forms a good second.

Curiously enough societies exist which seek to hamper scientific men in conducting their investigations, but none exist to check Tom, Dick and Harry from experimenting on animals with all sorts of drugs, and in their ignorance inflicting unnecessary pain and suffering upon them.

Our French confreres have arranged things very differently, and a step in the control of drugs with the avowed object of *protecting the public health* has been made by the carrying into effect of a decree promulgated on September 14, 1916, by the Ministry of Agriculture. By this decree the right to keep, prescribe and deliver toxic substances is limited, and it is forbidden for a druggist to sell, for the treatment of animals, certain poisonous substances named in a published list (preparations of arsenic, aconite, atropine, cantharides, chloroform, digitalis, ergot, opium, nicotine, savin, strychnine, morphine, cocaine, etc., etc.) without a prescription from a veterinary surgeon. Where a druggist and a veterinary surgeon both reside in a town or village the druggist only must keep and dispense the drugs which the veterinary surgeon has to order. It is only in well indicated cases that the veterinary surgeon can keep any of the list of drugs which he wishes to administer himself to the animals of his clients. When certain of these poisonous substances are sold they must have on a firmly adherent label with the name and address of the *authorised* veterinary surgeon, the name of the substance as given in the printed list, the prescription number as given in the veterinary surgeon's register, a plain indication that it is a *veterinary preparation*, and the word "poison."

There are many minor points of importance under the decree that have to be carried out by the chemist and veterinary surgeon jointly or independently, but the whole object of the order is to put the treatment of animals into the hands of skilled and scientific men and to abolish quackery and drug peddling by any ignorant or self-assertive charlatan.

Original Communications.

SOME OBSERVATIONS ON THE ROUTINE FEEDING OF MILITARY HORSES ON HOME SERVICE.

BY LIEUT.-COLONEL H. WATKINS-PITCHFORD, C.M.G., F.R.C.V.S.,
F.R.S.E.,

Commandant, Army Veterinary School, Aldershot.

The points dealt with below are as follows :

- (a) The employment of Cooked Food.
- (b) The feeding of Crushed Oats as compared with the un-crushed grain.
- (c) The use of Long Hay as compared with Chaff.

These points are sought to be illustrated by tabular statements and details of technique in the Schedules as follows, viz.:

Schedule A.

- (1) The Employment of Cooked Food.
- (2) The Feeding of Crushed *v.* Whole Oats.
- (3) The Use of Long Hay as compared with Chaff.
- (1) Weight Table, Cooked *v.* Raw Food.
- (2) Table of Specific Gravities in Fat and Thin Horses.
- (3) Scale of Rations adopted and analysis of same.
- (4) The Amylolytic action of Equine Saliva.
- (5) Table of heights and weights of various Army classes.

Schedule B.

- (1) Chart of Weights, Whole *v.* Crushed Oats.
- (2) Time of Consumption of Whole *v.* Crushed Oats.
- (3) Vitality of Undigested Grains.
- (4) Percentage of Oats Escaping Digestion.
- (5) Effect of absence of efficient Tooth-action on Oats.

Schedule C.

- (1) Times of Food Mastication.
- (2) Photograph of lengths of Fibre in Chaff and Long-hay Faeces.
- (3) Chart of Weights, Long *v.* Short (Chaffed) Hay.
- (4) Composite Chart to show possible weather influences.
- (5) Accelerating effect of Exercise on rate of Bowel Content.
- (6) Rates of Feeding of Bran-and-Oats *v.* Chaff-and-Oats.

1. The subjoined report is intended to deal with certain details of procedure in connection with the feeding of the Army horse under conditions of home service. These observations have been delayed owing to various causes incidental to the establishment of the present Research Institution, and the need for the recapitulation of some findings which appeared uncertain in significance.

2. The main part of the work was intended to ascertain the facts underlying such ordinarily-accepted details of stable management as the advantage attending (a) the employment of cooked food ; (b) the feeding of crushed *v.* whole oats ; and (c) the utility of chaff as compared with long hay.

3. Points other than these, however, have been attempted to be dealt with where they seemed to have any connection with the main enquiry, and in this way such observations are included as the times taken in food consumption, rates of passage of ingesta through the gastro-intestinal tract, some observations on mastication and salivary digestion, effects of external temperature, etc., subjects having an indirect bearing upon the main enquiry and, as such, brought under review.

4. The text of the report comprises only such matter as has seemed necessary to the elucidation of the subject, all details of technique, charts, weight-curves, etc., being attached as Appendices. This has been done in the endeavour to avoid obscuring the issues which form the subject matter of the enquiry.

5. The main points sought to be determined were, as stated in paragraph 2, the practical utility underlying the routine stable procedure of :—

- (a) Feeding boiled food to the horse.
- (b) Of crushing the oats given in the feed.
- (c) Of chaffing the hay.

None of these details are, as a routine practice, to be carried out without the expenditure of time, trouble and expense, but claims as to the advantage to be secured by their adoption have been widely accepted, more perhaps upon grounds of time-honoured stable procedure than for reasons of proved and practical utility.

6. *The question as to whether advantage attends the use of cooked food in the place of, or as a supplement to, the ordinary uncooked ration of the horse.*

Opinions have varied much in the past as to the utility of boiled food for the horse, and considerable diversity of opinion still exists.

Observation of horses receiving routine feeding with a liberal dietary of cooked food shows that without doubt certain physical changes are produced. Increase of body-weight and an increased roundness of muscle-contour and sleekness of coat, serve to produce, when well established, the appearance known as “dealer’s condition,”

in which state an animal is presumed to be of enhanced appearance and market value.

7. It is generally accepted that this increase of so-called condition is due to the deposition of fat within and upon the various organs and tissues of the body. In the endeavour to increase the condition in question it is usual to restrict the exercise of the animal to a minimum and so, by reducing the general tissue-waste, to deposit fat at its expense.

8. This theory is doubtless correct in the main, but it falls short in some respects. The results of tests made in the endeavour to prove the practical utility of cooking food (Schedule A, 1) show that an increase of weight attends the use of boiled food even where the routine work of the animal continues to be performed. At the same time the corresponding Control animal on dry food maintains its normal equilibrium. The factor alone of retarded tissue-waste brought about by absence of work fails therefore to account entirely for any recorded increase of weight attending the use of cooked food, inasmuch as such increase takes place when normal work continues to be performed.

9. If the explanation of increased weight is sought in the theory that increased water is necessarily ingested with food in a cooked state, several difficulties arise in acceptance of such explanation. The mechanism of adjustment between the intake and excretion of fluid is a very exact one, excess of water over and above the tissue requirements being rapidly eliminated in the normal animal. If the increase of weight and roundness of contour of the animal habitually fed on cooked food is due, therefore, to the retention of an excess of water in its tissues, it must be assumed that some state of physiological adaptation has become established by which the tissues of the animal have accommodated a percentage of water in excess of their normal content. That such tissue accommodation is a normal and physiological rather than an incipient morbid state would have to be taken for granted, inasmuch as no departure from the normal physical state is evident, nor does tendency to oedema of the extremities or "pitting on pressure" of other parts exist in the animal in "dealers' condition." Tendency to accumulation of water in the tissues of animals habitually feeding on succulent material containing high percentages of water does not exist in the normal state, nor does it seem possible that such condition could become established in the presence of a normal kidney and skin function. Conversely, it is generally accepted that adipose tissue—such as is present to a greater or lesser extent in the class of case under consideration—exists at the expense

of, and, as it were, in inverse ratio to, the percentage of water contained in the animal's tissues (*vide* A, 2). The ease with which a horse will sweat when in so-called "gross" condition is, in itself, no conclusive evidence of the presence of excess water in the system, as the same phenomenon, *viz.*, sweating, is evolved in physical states varying from, and sometimes directly opposed to, the condition in question. Nor has it been shown, so far as the writer knows, that, apart from that in the digestive tract, the mere presence of an excess of fluid in the system—presuming such is possible to exist in normal states—governs or even indirectly stimulates the complex nervous mechanism which regulates the excretion of sweat.

10. This question as to whether in the "gross" animal the increase of bulk and weight is due merely to the presence of water, may appear unduly laboured, but the practical conclusion which is sought to be determined appears to warrant a full review of all points. If the increase of weight and apparent improvement of condition attending the use of boiled food is a disability due merely to the presence of increased water in the tissues, the question is obviously different to one in which the condition in question connotes a state of improved metabolism or an increase of potential energy due to fat storage.

11. If, therefore, such increase of weight and condition attending the use of boiled food is due to the deposition of fat and not to restricted exercise or mere accumulation of water in the tissues, such increase can only have become established by an increased state of digestibility or net availability of the constituents of the cooked food, permitting more complete assimilation of these constituents than is able to be achieved by the control animal receiving raw food.

12. The endeavour to determine the general effect of feeding with cooked food was made by recording, at three-day intervals over a considerable period, the weights of a number of horses, half of which were fed with cooked food, while the other half—which acted as controls—received an equal amount of food in an uncooked state, the quantities in each case conforming to the scale of service rations issued at the time (A, 3). After feeding in this manner for a period of two months a change was made and the controls received the cooked food, while the original test animals returned to the normal ration. This latter arrangement remained in force for a period about equal to the duration of the former test, and throughout the whole experiment observations on condition and body-weight were carefully recorded in both groups.

13. Examination of the Charts of Schedule A, 1, will show the marked and prompt effect attending a course of boiled food, and it further serves to show that the physical result, though marked, returns rapidly to the antecedent normal condition when the food ceases to be cooked.

14. The cause of so rapid an increase is not easy to determine, and although in the metabolism of fat-production the influence of the carbo-hydrate principle is recognised as the determining factor, the ration shown (A, 3), with a starch equivalent of at most 10 lbs., would seem quite inadequate to the furnishing of such quantities of fat in so short a time, nor if such were possible could the equally rapid loss of body-fat attending discontinuance of boiled feeding be easily explained.

15. Difficulties therefore exist in accepting the sudden rise and fall of the weight in question as due either to fat formation or increased tissue water, and the question arises as to whether some other factor in connection with the complex metabolism of food digestion may not be found to explain the phenomenon. That formation of fat, and not accumulation of water, does take place under the conditions producing the so-called "dealer's condition" is undoubted, fat being deposited in well-organised layers and accumulations,* but such process must be a matter at least of weeks and not days.

16. The theory of an increased co-efficient of digestibility by which a greater percentage of the food becomes available through the process of cooking, is also not without difficulties of acceptance as a satisfactory explanation, although the action of heat upon the starch and cellulose elements of the food would undoubtedly tend to increase the availability of the contained nutriment by prompting disintegration and the conversion of starchy principles. Against such advantage, however, would have to be placed the fact that cooking tends to lower rather than promote the digestibility of the crude protein of the oat and hay. †

*In a horse in this condition, the "rolling" sensation imparted to the fingers on handling the ribs and back are found due to the presence of a single layer of fat deposited upon the *latissimus dorsi* and *external oblique* muscle of the ribs, and below the panniculus muscle, no obvious accumulations of fat existing under the skin, or in other sites than within the abdominal cavity, and, to a lesser degree, round the heart. No great differences exist in the actual specific gravity of the muscles of such a fat subject and the corresponding muscular tissue of a horse in a state of extreme emaciation.

† In this connection it is interesting to note the variance of opinion existing in veterinary physiology concerning the starch-converting property of the horse's saliva, the presence of the active enzyme "ptyalin," having either been questioned or stated to exist only intermittently. In order to observe this point of the amylolytic action of equine saliva, a number of horses (10) were tested at this Laboratory, their saliva being examined as to the presence of

17. It is, perhaps, hardly essential to the object of the report to show definitely which of the foregoing causes were concerned in the production of the increase of body weight under consideration. The exact determination of this point is now being attempted, and a final report will be submitted on the conclusion of the observation. It seems sufficient for practical purposes to show that a definite *rationale* underlies the use of boiled food, and that by this means a pronounced "alternative" effect is undoubtedly produced in the system of the horse.

18. The marked rise in the weight-curve which occurs in the horses habituated to dry food for a long period (*vide* Chart A, 1, April 18) demonstrates this fact better than in the earlier case of animals put on to boiled food (February 17) after a short observation period of two weeks. It is interesting to note also that the maximum physical effect—as reflected in the body-weight—would seem to have been attained after five or six weeks and that the weight-increase after that period ceases.

19. The increasing external temperature which apparently tends to produce an upward curve of the dry-feed line about the end of March seems to produce no parallel effect in the case of the boiled food, and the writer is at a loss for an explanation of this difference, as the two groups of cases (test and control) were maintained under conditions which were identical in all respects, other than the difference in their food.

20. The fall of weight which ensues rapidly upon the cessation of the special feeding appears an indication of the inapplicability of boiled rations in the case of the average normal working horse where it is desired to maintain a constant standard of efficiency. No great difference in the appearance of the two groups of horses was observable at the conclusion of the test, and, when worked in pairs (that is, one test animal and one control in harness together), no obvious difference in performance was noticed. It would appear, nevertheless, an impractical and unsound system whereby horses are brought into a condition of unstable weight-equilibrium and only maintained there at the cost of artificial dieting, even if by such treatment their capacity for work is to some extent increased. When, however, this advantage cannot be claimed, and the disadvantage of loss of condition

ptyalin immediately before feeding (when the salivary glands were in a condition of excitation) and half an hour after finishing an ordinary feed. Reference to Schedule "A," No. 4 shows that in all cases, both before and after food, the saliva contained a ferment capable of reducing starch to maltose or erythrodextrose dependent upon the percentage in which the saliva was added to the starch solution. The activity of equine as compared with human saliva was, however, considerably less within the time observed.

upon discontinuance of special conditions of feeding must be entailed, the general undesirability of boiled food for the average working horse in normal health must be concluded.

21. Where however abnormal states of health and condition obtain the question is a different one, and the adoption of the system would appear fully justified in sickness and convalescence where rapid alterative and restorative effects are sought.

B.

THE FEEDING OF CRUSHED *v.* WHOLE OATS.

22. Greater variance of opinion exists as to the utility of crushing oats than attends the question of the advantage of cooking the food of the horse. The subject is here attempted to be dealt with in such a way as to furnish ground for an accurate decision of the question. Several points claim consideration, but the primary one from the point of view of this report is a determination as to whether an increase of feeding value is found to attend the process of crushing.

23. On this point of increased nutritive value or "availability" of the crushed corn differences of expert opinion have existed. Such differences are very briefly reviewed as follows:—Gay records that in horses fed with whole oats 64 per cent. of the grain was digested, while 72 per cent. was digested when coarsely ground. Kellner showed a saving of .5 to 1.6 per cent. by crushing. Jordan found an increase of digestibility amounting from 3 to 14 per cent. Against such findings can be placed the conclusions contained in the Wisconsin Bulletin 275 of 1917, where a thorough test was made during the spring and summer with eighteen working horses under carefully controlled conditions, with the result that, while the horses to which oats were fed lost only 8.3 lbs., the animals receiving a ration of crushed oats 10 per cent. less in quantity than the uncrushed ration lost 38.5 lbs., the final conclusion of the observers being that "unless oats can be crushed for considerably less than 10 per cent. of the cost of the whole oats such preparation will not pay even for horses at hard work."

24. The conjectural nature of the advantage attending the process of crushing tends to be borne out by the present findings, and the writer has no strong or practical arguments to advance in favour of the procedure, while valid objections of greater or less weight can be advanced against it.

25. The present attempt to show any difference subsisting was made by recording weighings, in a similar manner to those employed with

the former test. Ten horses were fed with well-crushed oats and ten horses were maintained on whole oats as controls, both receiving identical treatment in other respects. The black line of the Chart B, 1, indicates the weighings of the whole-oat or control horses, and it will be noticed that though the average combined weights of these controls was at the commencement some 15 lbs. below the combined weights of the crushed-oat horses this black line tends gradually to surmount the red line, indicating—so far as actual body-weight is concerned—a slight balance in favour of the whole oat. On April 14 the diet was reversed and the animals which had received whole oats had their corn crushed. Conversely the horses which for two months had been fed on crushed oats were changed abruptly to whole grain.

26. The points which seem worthy of noting are (a) no falling off is observable in the animals long habituated to crushed grain when they are suddenly put on whole oats. As a stable procedure this has generally been considered inadvisable if not risky, the horse being credited with "bolting" whole grain when not used to the same, with the attendant consequences of colic and loss of condition. That such impression is mistaken when applied generally will be seen on reference to Schedule B, 2, where it is shown that, though the times of deglutition of a corn feed vary within considerable limits, the average time spent by 25 horses in consuming a feed of whole corn is greater than the time taken in eating the crushed oat feed. No consequent "slump" therefore appears to attend the reversion from the artificial to the normal conditions of feeding, such as was noticed in the case of the horses habituated to boiled food.

(b) 27. The second point noted in attempting to interpret the weight-curve B, 1, is the slight improvement which ensues in horses long habituated to whole corn when the latter is crushed* (April 14). No such upward curve is to be noted at the commencement of the experiment on February 17, which would seem due to the same factor, as noted in the weight-curve of Schedule A, *viz.*, insufficient length of the period of observation (two weeks) in which to establish habituation to environment (constant conditions).

28. A general survey of weight-curve B, 1, leads to the conclusion that a slight advantage does attend the feeding of crushed oats to horses. The advantages, however, are only slight, and it is

* It might here, perhaps, be noted that the betterment brought about by the conditions of exactness demanded by the experiment in the matter of regularity of feeding, exercise, etc., was noticeable in all the 60 odd horses under critical observation. Regularity of habit in the human subject has been recognised from time immemorial as conducive to optimum conditions of health; a principle of hygiene which probably applies not only to the horse, but throughout the animal kingdom.

difficult to find the underlying reason. Theory has always held that the disintegration of the grain by crushing exposes the interior of the corn to digestive fluids more thoroughly than occurs in the case of the whole oat. Theoretically this should be so, but practical observations show that the percentage of oats which escape the grinding action of the molar teeth is almost negligible, while examination of such oats as have passed through the digestive process shows that a very thorough exposure of their internal structure to intestinal juices has taken place. Only occasionally will it be found that an oat-grain so escapes the action of the teeth and the gastro-intestinal juices as to be capable of subsequent germination. The highest percentage among ten such trials was only .075 per cent. (*vide* B, 3). Of the number of grains so incompletely disintegrated as to retain the appearance of a whole corn only a small percentage could be recovered (varying from .097 per cent. to 2.2 per cent.) in some twenty examinations (*vide* B, 4).

29. That the efficiency of this disintegration depends upon the efficiency of the teeth and does not rely to any extent upon the solvent action exerted by the stomach or bowel, seems clear from the table shown (B, 5) in which a known number of oats (coloured in such a way as to be recognisable on leaving the body) was introduced into the horse's stomach in the form of a bolus, thereby avoiding the action of the teeth. It will be seen that a large percentage of these grains were recovered finally in a whole state.

30. Recognition of this essential function of the teeth—which receives an added significance in view of the diastatic action of the saliva (footnote paragraph 16) — affords what seems to be the only valid argument to be adduced in favour of the adoption of the practice of crushing oats. Where the teeth are in a normal condition such procedure is unnecessary, but where impairment of function exists through age or accident, or where dentition changes are occurring in the molars of the young animal—from the first to the fourth year—the practice of crushing finds its justification.

31. Advantage may also fairly be claimed for the process in states of sickness, debility or convalescence, but the total sum of advantages is not a large one, while there are attendant disadvantages which must be placed to the other side of the account. Oats are not to be efficiently crushed without expenditure of time and trouble. Hand machines are out of the question where any large numbers of horses have to be provided for. If oats are supplied by contractors in a crushed state the uncrushed oat cannot be inspected, and the greatest safeguard is thus then removed whereby only sound corn reaches the horse. In any case, the factor of cost, or its equivalent in time,

must be considered. It is generally computed that the expense of bruising is approximately 10 per cent. of the cost of the grain, including the extra cartage involved. This figure seems approximately correct for the purposes of the question under consideration where oats ready-crushed may have to be supplied to the service. Where the unit concerned undertakes its own crushing the liability is not, of course, so great.

32. Besides questions of cost must be reckoned the drawback—especially from a military point of view—of increase of bulk. Oats occupy approximately 75 per cent. more space when crushed than when whole. From a transport point of view such consideration is an important one.

33. The hygroscopic, or water-absorbing, power of the crushed grain is considerable. If storage room has to be provided it is essential that it should be dry. In tests made at this laboratory it has been noted that the crushed oats, which contain only 10.15 per cent. of moisture on being crushed, rapidly absorb water—from an ordinary stable atmosphere—until they contain 31.75 per cent. at a time that a control test of whole corn rose only from 10.15 per cent. to 14.5 per cent.

34. The writer concludes, therefore, that the system of crushing or bruising the oats fed to the Army horse seems, with the exceptions mentioned in the immediately foregoing paragraphs, devoid of sufficient utility to justify general adoption.

THE UTILITY OF CHAFFING HAY.

35. Most practical horsemen endorse the system of cutting or chaffing the hay fed to a horse when oats or other corn are fed at the same time. The main advantage held to accrue from the mixing of the corn with a bulk of chaff is that the animal takes longer in feeding and the oats become, in consequence, more thoroughly broken up and exposed to the action of the digestive juices.

36. Experimental observation tends to confirm the soundness of such a view, and it is interesting to note the differences in the time taken in consuming feeds containing chaff as compared to the time taken where long hay is given in the place of chaff, or where the corn is given by itself. Reference to Schedule C. 1, shows that the time taken in the mastication of a feed of oats is more than doubled when the corn is mixed with half its weight of chaff, and this delayed action is observable as much in the case of the rapid eater ("greedy feeder") as in the case of the more deliberate one. This table shows that the average time taken in consuming a feed (of 4 lbs. of whole corn mixed

with 2 lbs. of chaff) was $47\frac{1}{2}$ minutes, whereas an equal amount of corn fed without chaff was consumed in about 20 minutes. With crushed corn these times were slightly shortened, a fact which does not accord with the prevalent notion that the horse is liable to shorten the period of mastication—"bolt his corn"—when given whole oats without chaff.

37. This "restraining" action of the chaff as exerted upon the corn is probably the only useful purpose it serves, as there would seem to be no appreciably increased digestive action exerted by the digestion upon the chaff, over and above that taking place in the case of long hay. This would appear to be borne out clearly by the photograph (C, 2), which shows the actual length of the fibre of long hay and of chaff after leaving the body. It is difficult to determine from observation of the material in question whether it was fed originally in the form of chaff or long hay. If, therefore, the horse naturally chaffs his long hay as completely as the chaff-cutter there would appear no object in the mechanical process other than that resulting in a more deliberate grinding by the teeth and a more prolonged contact with the salivary secretion.

38. Apart from this restraining action there appears little to urge in favour of chaffing. The possibility of feeding indifferent hay in the form of chaff when it would be refused by the horse in a long state is, of course, a questionable advantage.

39. From inspection of Chart C, 3, it is evident that long continued feeding on chaff only does not impair the horse's ability to deal with long hay when the latter is made suddenly to replace the chaff (*vide* change on April 7), while, conversely, there appears some reason to conclude that the control animals—which for some months had received only long hay—did not adapt themselves without some difficulty to the change from long hay to chaff.

40. Nor can it be urged against chaffing that the horse in grinding or cutting the long hay wastes energy upon maintenance which might otherwise be applied to dynamic purposes, for, as has been shown above, the feeding of chaff does not exempt it from the same prolonged chewing as that which long hay receives.

41. While such objection fails to be sustained it must be admitted on the other hand that, as far as can be judged, horses prefer hay to chaff and find satisfaction in the more natural act of seizing and chewing the longer fibres of the uncut hay. This is, perhaps, in parallel with the satisfaction—or at least complacency—shown by the ox when re-chewing its food during the act of rumination.

42. Apart, therefore, from the time and expense entailed by chaffing it is concluded that chaff serves no purposes beyond the exertion of a retarding effect upon the mastication of the corn. Other than this passive—though important—effect it would appear to serve no useful end.

In attempting the interpretation of the weight-charts included in the Appendix, it appears necessary to construe the curves shown in conjunction with the weather conditions obtaining at the time. A composite chart, therefore, is attached (Schedule C, 4) showing the average weights of all the horses (both test and control) throughout the period, and against this curve is plotted the average daily temperature curve. A general correspondence appears possible between an increasing weight and an increasing daily temperature. It would, perhaps, be anticipated that the increasing external temperature would divert some of the food constituents from the thermic into the dynamic form of energy, or, in other words, the lessening call upon the food for heat maintenance would result in fat or weight production. This seems to be the case, at any rate in the horse, and is, perhaps, an explanation of the increased well-being generally observable throughout the animal kingdom in the spring time of the year.

APPENDICES.

SCHEDULE A (1).

It will be noted that the average weight of the test horses (shown as a heavier dotted line) at the commencement of the experiment was 21 lbs. below the average weight of the control animals, and that this difference was maintained during the initial period two weeks (February 3—17), during which period both test and controls were receiving the normal service ration uncooked.

Four days after the administration of the cooked food to the test horses their average weight tends to approximate that of the controls, and from then for a period of about six weeks they tend to equal or exceed the weights of their controls. After this period, however, the controls (on dry food) commence to rise and again surmount the test animals (a change due, apparently, to the increasing external daily temperatures by which less energy was required to be expended upon the raising of cold food to body temperature with a resulting reduction or lessening of the maintenance requirements of the body and a consequent increase of weight). This seems the only explanation of the rise in the dry-food line about this period.

At the expiration of two months (April 14) the conditions are abruptly reversed and the horses long habituated to warm cooked

food suddenly receive ordinary dry food, while the controls habituated to dry food receive the warm cooked food. The result here is two-fold and marked, resulting in a few days in a gain to the boiled food of about 28 lbs. on the average, while the horses suddenly returned to dry food lose almost as much weight within a similar period.

The practical significance to be attached to such facts is not easily apparent. Two points are of special interest, firstly, the marked result of sudden change of food-habit. This is seen best attending the second change of food on April 14. At the first change there was lacking the influence of long-sustained routine treatment, the animals had come from varying localities and were convalescing from differing disorders. The 14-day preliminary observation period was probably too short to establish the impress of an environment in which sustained and constant conditions obtained. The result of the first change, therefore, is less marked than that of the second. In the latter case, however, both test and control animals are involved in an abrupt food change and the consequent divergence between the two groups is more pronounced.

(To be continued.)

AN INTRA-DERMAL PALPEBRAL REACTION.

By HOWARD B. COLLETT, B.V.Sc. (TORONTO), M.R.C.V.S.
(late Captain, Royal Army Veterinary Corps).

THE photograph opposite shows a very typical and characteristic reaction to the mallein test. After the signing of the Armistice our division (54th) was brought back from Syria to Egypt, and stationed at Helmieh, just outside Cairo. Soon after our arrival there malleinization of all animals in the division took place. The subject of the illustration, a light draft horse belonging to H.Q. 161 Infantry Brigade, gave the following reaction:—

At the 24th hour after injection (9 a.m., December 19, 1918), there was swelling of the lower lid, very tense and painful, and accompanied by a slight muco-purulent discharge from the eye. By the 36th hour, the reaction was very noticeable, the upper eyelid was swollen, and the discharge from the eye was much increased. At the 48th hour the reaction was still more marked: both eyelids were very swollen, and the discharge adhering to both lids had partly gummed them together. The eye could hardly be seen. At the 60th hour the reaction was stationary, but by the 72nd hour it had commenced to subside. Shortly after this the animal was destroyed.



CONJUNCTIVITIS—A COMPARATIVE STUDY.

By G. GAIR, M.R.C.V.S.

Canon Bridge.

INFLAMMATION of the conjunctiva may be of bacterial or traumatic origin, or it may only be a secondary manifestation of primary foci elsewhere.

The mechanism concerned in the movement of the eyelids is one of great physiological interest. One has only to look microscopically at the picture of the palpebral conjunctiva and note the structure of the stratified epithelium and subepithelium supporting the vertically arranged vessels with the lymphoid follicles, and particularly the plexes of nerve films, to know what a highly sensitive membrane the conjunctiva is, and with what extreme rapidity such a delicate structure may become affected. The infective process may develop so rapidly that, unless checked, removal of the eyeball may have to be adopted.

Considerable opportunities were offered to me for examining a large amount of morbid material from the eye of the human subject, of the horse, ox, and dog, and it may be of interest to know the various infective agents commonly met with, and the situations of the eye in

which they were found. Some of the infecting agents are : *Staphylococcus*, *Streptococcus*, *Pneumococcus*, *B. Coli*, *M. Catarrhalis*, Koch Weeks bacillus, *Morex-Axenfield bacillus*, *Friedlanders bacillus*, *B. Pyocyaneus*, *B. Tuberculosis*, and *M. Gonococcus*.

Organisms affecting the eye are, as a rule, hæmophilic, and some also require special media for their culture. It is, therefore, essential to use blood agar and serum agar in making bacteriological examinations in cases of eye infections. Koch Weeks bacillus grows freely only in the presence of blood serum. The vitality of this organism being slight, immediate transference of the material is necessary. Many of the hæmoglobinophilic bacteria will grow with only 1 in 500 hæmoglobin. Smears from the conjunctival secretion show Gram negative bacillus within pus cells, as well as some lying free. The period of incubation with this organism is short, 12 to 36 hours. These are important factors in spreading this disease in Egypt. The Diplobacillus of Morax causes a mild blepharo conjunctivitis at the internal angle of the eye. They occur in pairs, and are 1 η to 2 η long. They form little pits of liquefaction in Löffler's serum within 24 hours, and the fact of their becoming confluent may be looked upon as characteristic. They do not neutralise agar.

A somewhat common form of Staphylococcal conjunctivitis is met with in young children two to four weeks old. Occasionally a considerable number of cases of conjunctivitis occur in young children caused by the *Pneumococcus*, the disease advancing so rapidly that hypopyon is common in 24 hours. In the human subject, it is known that another organism, the *M. Catarrhalis*, not only occurs in the nasal secretions, but is responsible for certain epidemics of conjunctivitis as well as coryzas and bronchial affections resembling influenza. In some localities a condition prevails resembling a form of chronic ulcerative keratitis due to a member of the *M. Catarrhalis* family in which a general superficial erosion of the cornea progresses to infiltration of the more superficial layers, then affecting the deeper structures of the cornea. Consequently intraocular tension falls, and eventually sight is lost. *M. Catarrhalis* strikingly resembles the *Meningococcus*, and can only be differentiated by cultural procedure. *M. Catarrhalis* grows on plain agar at room temperature, and does not produce acid on glucose media, whereas the *Meningococcus* requires blood temperature for its growth, and ferments glucose and maltose.

Recently an extensive outbreak of conjunctivitis due to the *M. Catarrhalis* occurred among the calves of a Shorthorn herd in this practice. All the calves in the herd, to the number of twenty, were affected, some of them being up to five months old.

The disease was evidently contagious, and it showed an incubation period of five days. Newly-born calves placed among the affected ones showed symptoms in four to five days. The disease took three weeks to run its course. Lachrymation was very marked, causing complete denudation of the hair below the eyes. Swabs were taken from the eyes of some of the calves, and cultures made on blood agar. The *M. Catarrhalis* was isolated and showed an overwhelming preponderance over other organisms. One of the calves from this herd was sent to another herd six miles away, with the result that all the calves at this place became similarly affected.

In the horse, conjunctivitis is frequently of a pneumococcal nature, especially when of a traumatic origin. In one case which came under my observation, the *Pneumococcus* was responsible for hypopyon and panophthalmitis preceded by conjunctivitis.

In affections of the eye, toxæmic symptoms are rarely present, the tissues of the body being apparently able to elaborate the necessary antibodies.

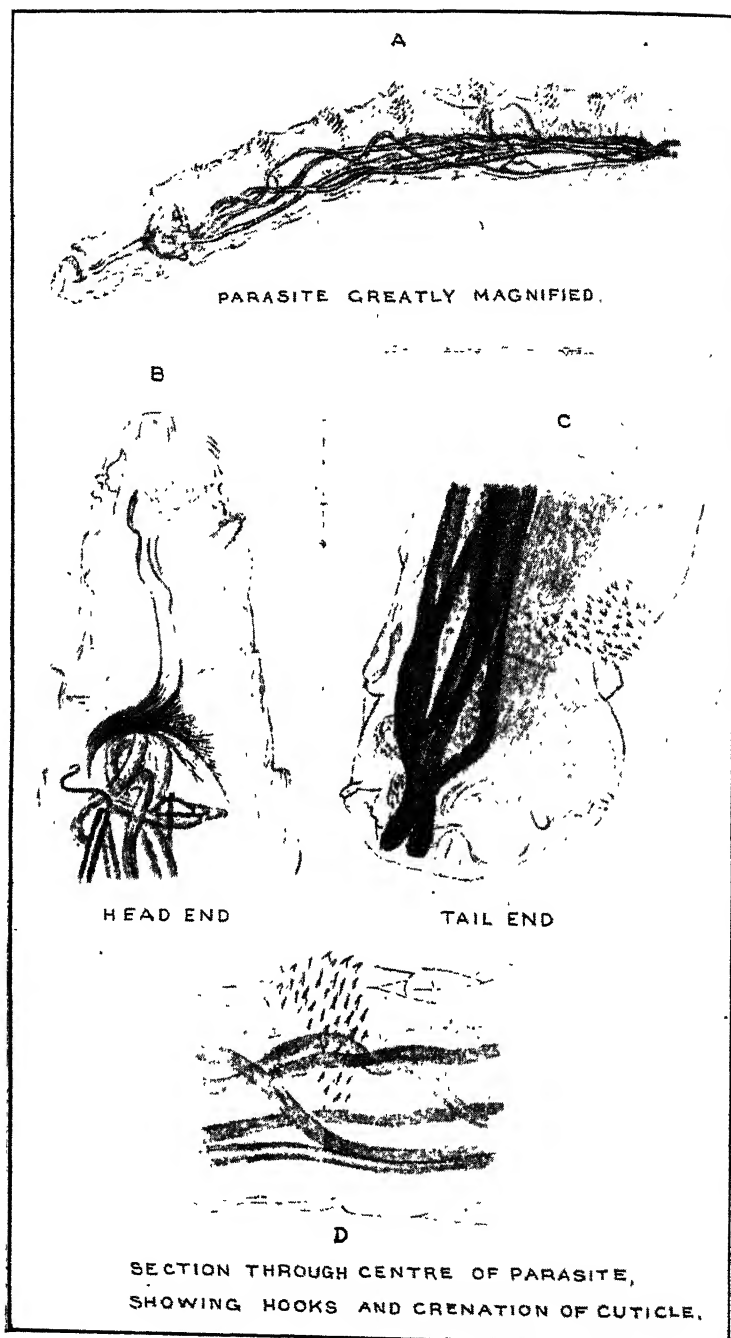
In cattle, interstitial keratitis is often of tubercular origin. In the human subject, also, this condition is frequently due to the *B. Tuberculosis* and also to the *Treponema Pallidum*. Secondary infections are common. Considerable success accompanies vaccine treatment in the human subject when treating bacterial diseases of the eye. Should it not be as successful in Veterinary Medicine?

It is advisable in taking samples of morbid material from the eye to thoroughly flush out the conjunctival sac with normal saline solution, and then to cover with a pad for an hour or so prior to taking the samples.

A PARASITE FOUND IN THE PORTAL VEIN OF A SHEEP.

By E. SEWELL, M.C.
(Indian Civil Veterinary Department).

WHILST searching for schistosomes, the parasite illustrated was recovered from the portal vein of a sheep. In the living state, it measures about 1.75 mm. long by .2 broad. Under the microscope it could be seen moving rapidly, its movements resembling those of a caterpillar. From the well-marked nerve ring, with its attendant nerves and ganglia, the rudimentary sexual organs, antennæ and feet, and the structure of the cuticle, it would appear to be a larval diptera. Its armature suggests that it is well adapted for making its way through tissues, the direction of the spines on the back ensuring forward movement.



MORTALITY OF DIETETIC ORIGIN IN PREGNANT EWES.

By MAX HENRY, M.R.C.V.S., B.V.Sc.
Department of Agriculture, New South Wales.

THE opportunity was recently presented of investigating a considerable mortality which had taken place amongst pregnant stud ewes on a large farm in the Central Western District of New South Wales. This whole district has undergone a prolonged and severe drought, and when visited (March 12, 1920), there was not a green thing in the way of stock food on the farm. The mortality had occurred amongst a number of Merino ewes of various ages, but mostly 6 and 8-toothed and broken-mouthed, which were to lamb in anything from a fortnight to ten weeks. The total number of deaths up to the date of visit was forty, all under practically the same conditions. This loss occurred during the preceding six weeks. The feed of these sheep consisted of silage three to four years old, which had been stored in pits, and scrub (by which term is meant in this country the lopped branches of various edible trees more or less digestible and nutritive), mostly "Currant Bush" (*Apophyllum anomalum Capparideæ*) and lately some wheaten hay. The silage both looked and smelt well, did not appear to have any fungus or mould on it, and was greedily devoured. The silage had been fed since January 20 at about the average rate of 2½ lbs. per sheep; the scrub since January 16 at about the rate of 3 lbs. per sheep—but this must be a very vague guess; and the hay for only about four days at the rate of about 1½ lbs. per diem. These sheep were known as the 2nd and 3rd class stud ewes.

It is important to note the feeding of the other sheep on the farm. The ewe hoggets in an adjoining paddock to those in which mortality had occurred were getting the same feed. The breeding ewes of the special and first class had been in another paddock, which was good enough to feed them, and had only received silage for the last week or so, and scrub for only about four days. An inspection of these ewes showed them to be in superior condition to the 2nd and 3rd class stud ewes amongst which mortality was occurring. Both lots were strong and alert, nevertheless one death occurred amongst the 1st class in the previous week. The rams were living in another paddock on what they could pick up, and the ration sheep on the stubble fields. The flock ewes had been fed on silage in the cultivation paddocks for the last four or five weeks, but had received no scrub. No deaths had occurred amongst any of these sheep, except amongst the flock ewes, two of which had recently died.

The water supply was all from bore water, which is pumped into raised tanks and then runs into troughs.

The summer had been very hot and dry, and was at the time still hot and sultry.

The following cases were seen :—

1. 6-tooth Merion ewe, far advanced in pregnancy, condition good, standing in corner of paddock in listless attitude. On being approached, made no effort to move ; no notice taken of threatened blow or movement made towards the eye with the hand, unless very violent. Head carried a little to one side (left) and slightly raised. On being turned round and pushed it moved a few steps forward with a somewhat groggy action and then stopped. No attempt was made to escape on being recaptured. Respiration hurried. *Post-mortem*: Killed by bleeding. Skin and subcutaneous tissues normal. Peritoneal cavity contained about a dessertspoonful of colourless fluid. Peritoneum normal. External surface of abdominal viscera normal. Rumen, reticulum, omasum and abomasum normal internally. Mucous membrane of abomasum pale and a little icteric. Small intestine normal, containing some bile stained fluid. Large intestine normal, but contents in lower part of colon and rectum distinctly hard and dry, one faecal mass being two inches by $1\frac{1}{2}$ inches and very dry. Some blood staining of faecal masses in this part. Mesenteric lymphatic glands normal. Omental fat fairly plentiful. Spleen normal. Liver pale, friable, greasy, yellow, no parasitic infestation, normal in size. Gall bladder full, kidneys pale, friable, greasy and yellowish red. Capsule strips normally, no visible lesions. Suprarenal glands apparently normal. Fat surrounding kidneys plentiful, bladder normal, abdominal lymph glands normal, lungs normal, except for one small caseous lymphadenitis abscess. Pleura normal, heart appeared flabby, a little pale in colour, normal in size. Pericardium normal, brain normal ; fluid present in cavity appeared in excess, and meninges were tense when bones were removed. The brain was carefully removed and sliced longitudinally in numerous slices, but no lesions of any sort were visible. Medulla oblongata was treated in the same way and found normal. Eyes normal. Udder showed practically no evidence of approaching functioning. The uterus contained twin lambs, apparently within 2-3 weeks of full time. Both were well grown and without noticeable defect. Viscera of lambs appeared normal. Membranes and cotyledons appeared normal. No turbidity nor evidence of uterine infection of any sort was present.

2. Full mouth Merino ewe. Found in paddock lying down in comatose condition with one eye picked out by crows. Killed by bleeding. Skin normal. No discharge from vulva. Subcutaneous tissues normal with very little external fat. Condition poor. Peritoneum normal, containing a dessertspoonful of clear colourless fluid. Omental fat fair. Rumen full but not distended. Contents dry and solid. Reticulum normal, contents on dry side. Omasum normal,

almost empty. Abomasum normal, contents drier than usual. A few stomach worms (*Hæmonchus contortus*). Mesenteric glands normal. Small intestines normal and fairly empty; contents deeply bile stained. Cæcum contained two masses of very hard and dry ingesta each measuring about $1\frac{1}{2}$ by $1\frac{1}{2}$ inches. Large colon contained two similar masses, but larger and drier. Rectum normal, fæces very hard. Liver pale, yellow, greasy, friable. Portal gland normal. No parasitic infestation of liver. Gall bladder normal, not distended. Bile normal. Kidney, fat, fair. Kidney substance a little pale and soft. Capsules strip easily. Suprarenal capsules rather pale, but otherwise normal. Lungs normal. One caseous lymphadenitis abscess in mediastinal lymphatic gland. Heart normal. Udder showed practically no sign of preparing for milk supply. Gland tissue and lymphatic glands normal. Cranial cavity contained an excess of fluid. Meninges normal, brain tissue normal, spinal cord normal, air sinuses normal. Uterus in normal position and condition, one lamb normally placed. Fœtal membranes, cotyledons, umbilical cord and uterine fluids normal.

Eleven other cases were seen showing in general the same symptoms, and in the case of those that were killed or died, the same post-mortem appearances. An additional symptom noted in various cases was the occurrence of spasms, the ewe when approached moving backwards with stiffened, quivering legs and the head held down into the chest. This condition lasted for a few seconds, and then passed off, and the animal tried to escape normally, but in turning collapsed. Response to external stimuli was very slight and imperfect in most cases. In all cases pregnancy was far advanced. All contained living lambs except one, in which one lamb was found to have been dead some little while, as the cord and cotyledons were discoloured; the lamb a dirty brown colour, and the amniotic fluid turbid. A large blood clot was present in the fœtal membranes. There was a history that this particular ewe was carried on horseback a day or so before. The changes in the liver were the most constant post-mortem lesions and next to that the dry condition of the ingesta and fæces.

In order to obtain a comparison, the opportunity was taken of making a post-mortem examination of a sheep being killed for rations.

Cross-bred ewe; not pregnant; general condition very good. All viscera normal except the liver, which contained one small cyst and was a little greasy, but normal in consistency and colour. Contents of intestines and stomach moist and normal. Although difficult to exactly define by words, the healthy, satisfactory appearance of the digestive organs and their contents, in contrast with those of the ewes previously examined, was most striking.

Another ration sheep was also examined, giving the same general appearance as above, with normal liver.

Advice was given that all sick sheep should be brought up from the paddocks to the small hospital paddock, and fed and watered there, individual sheep being, if necessary, quietly taken up to the trough for water and having feed placed before them, or being taken to the feed trough. That the sick sheep should be fed preferably on green lucerne hay, or failing that, on bran or other laxative nourishing diet. That the ewes in the paddock whence the sick ones were coming should receive a partial ration at least of the same sort. That the quantity of mag. sulph. in the lick should be increased to 20 per cent., and that each sick ewe when brought in should be drenched with mag. sulph. 3 ounces. The administration of Nux Vomica and Calc. Phosphate was also recommended, but owing to the success following the dietetic changes, was not administered. These measures were based on the theory that the whole mortality was due to the ewes having been for a long time during pregnancy fed on a diet which was only a maintenance ration, and though sufficient to support the animal's life, was vitally deficient when the extra drain of advanced pregnancy was superadded. The diet was in part also of a constipating nature. The combined influence of pregnancy and lack of nutritive essentials in the food, plus an auto-intoxication from continued constipation, resulted in a general lowering of the tone of the viscera, and the animals at length arrived in a condition of extreme depression and partial coma. They ceased to make efforts to obtain food and water, rapidly became worse, and died.

The opinion was expressed that mortality could not be expected to cease immediately, no matter what was done, and that unless steps were taken in regard to the feed, mortality amongst the first class ewes might be expected. The matter was dealt with with commendable energy by the manager, the scrub feeding was cut out, and a chaff and bran ration supplied to the stud ewes. This was fed in troughing made out of sacking nailed on either side to wood, either small tree trunks or battens. One foot of troughing was allowed for sheep, and the feeding was economically and easily carried out.

The ewes were divided into lots of 600 in order to prevent overcrowding. As one would expect from the history, the milk supply of the ewes was poor; most of the lambs, however, were saved. An immediate improvement was noticeable, and from three days after the change of diet, no further cases which could be ascribed to the condition in question occurred.

The ration allowed per sheep was as follows:—

Monday, Wednesday and Friday.—1 lb. chaff and 1 ounce bran, mixed and fed in troughs ; 1 lb. ensilage spread on ground.

Tuesday, Thursday and Saturday.—1 lb. of lucerne hay and 1 lb. ensilage spread out on ground.

Sunday.—1 lb. chaff and 1 ounce bran, fed in troughs, and 1 lb. lucerne hay on ground.

Analyses of the original food supply of the sheep were made by Mr. F. B. Guthrie, the Departmental Chemist, and were as follow :—

	"Silage."		"Currant Bush."	
Moisture	58.39		21.48	
Albumenoids	3.94		9.62	
Ether Extract	0.18		2.13	
Ash	4.84		6.66	
Fibre	14.79		38.88	
Carbohydrates	17.86		21.23	

In searching the available literature for references to similar outbreaks, the best description was found in the *Journal of the American Veterinary Medical Association*, August, 1919, entitled, "Stercoremia of Sheep," by E. A. Bruce. In many other instances of mortality in pregnant ewes the point is emphasised that the ewes were in over-good condition, and on full feed, while constipation appears to be regarded as of secondary importance. This was not so in the cases under consideration, and the conclusion reached by Bruce that at least some of the cases which have been diagnosed heretofore as preparturient eclampsia and prepartum paralysis are in reality cases of stercoremia would appear justified. In this instance the constipation was partly due to the fibrous nature of the food, and to lowered tone, consequent on deficient diet.

The whole question is one of very considerable import in this country where drought conditions recur at irregular intervals, and where in only a minority of cases do sheep receive any food beyond what they gather in the paddocks.

OBSTRUCTIONS IN THE VAGINAL PASSAGE OF CATTLE.

By W. C. HAZELTON, M.R.C.V.S.,
Buckingham.

I HAVE recently come across two interesting and uncommon obstructions in the vaginal passages of cattle, the knowledge of the existence of which may be useful to the young practitioner.

One was a strong fibrous band extending vertically from the roof to the floor of the vagina of a heifer which had passed her first calf two days previously. I was called in by the owner on account of some difficulty which he had experienced in trying to remove the placenta membranes. When I arrived I found these to be hanging out of the

vaginal orifice, and apparently prevented from escaping completely by something or other inside. Upon examination I found a tough fibrous band about as thick as a walking-stick extending, as stated above, from the roof to the floor. I cut this through with scissors and the placental membrane at once tumbled out. There was no hæmorrhage, and no need for further treatment.

The second case was one of dystokia, and from the outside nothing was visible, but the cow was straining with labour pains. Upon passing my hand into the vagina I discovered a pedunculated tumour as large as a child's head, completely occluding the passage. After some manipulation I passed this back beyond the pelvis and the calf was delivered without difficulty. The tumour appeared to me to be a lipoma, but I had no further opportunity of examining or removing it, as the cow was sold shortly afterwards.

EMPHYSEMA DUE TO A BONE IN THE ŒSOPHAGUS OF A HEIFER.

By W. C. HAZELTON, M.R.C.V.S.,
Buckingham.

A SHORT time ago I was called to see a yearling heifer Shorthorn which the owner stated to be suffering from indigestion. Upon examination I found a condition of general emphysema, the whole of the body being affected, and extruding from the sub-maxillary space to half way down the neck there was a dropsical swelling, which pitted on pressure.

Respiration was accompanied by painful grunting, and I could see that the animal was almost *in extremis*. She died about an hour later, and post-mortem examination revealed the presence of the shank-bone of a sheep firmly impacted in the œsophagus, about six inches below the pharynx.

The lower end of the bone was jagged, and had made a lacerated hole through the wall of the œsophagus, through which a quantity of food (the contents of the rumen) had escaped and had gravitated downwards into the thorax as far as the heart itself, causing septic pericarditis.

The gases from the rumen had become eructated and had found their way through the jagged wound in the œsophagus into the subcutaneous tissues, causing the extensive emphysema.

I thought that the case was well worth placing on record on this account, as the cause of the emphysema was somewhat of a puzzle to me to diagnose until I had the opportunity of tracing it by the post-mortem examination.

AN INSTANCE OF LONGEVITY IN RINGDOVES.

By FREDERICK HOBDAY, F.R.C.V.S.,
London.

A PAIR of ringdoves, cock and hen, were recently brought to hospital to be painlessly destroyed for certain sentimental reasons. I had personally known the birds for fifteen or sixteen years, and my client had known them since 1900, at which time they were said to be two years old. This would, therefore, make them to be each of the authenticated age of twenty-two years.

They appeared to be in excellent health, and except as stated above, "for sentimental reasons," there was no cause for their destruction. They were put painlessly to sleep with chloroform. Upon looking up the subject in Marshall's "Physiology of Reproduction," I find it stated that canaries are stated to have attained the age of twenty years, a herring gull forty-four, an imperial eagle fifty-six, a heron sixty, eagle owl sixty-eight, raven sixty-nine, swan seventy, and a goose eighty.

EFFECTS OF HYOSCINÆ ON AN ANIMAL AFFECTED WITH
BROKEN WIND.

By CAPTAIN J. R. HODGKINS, D.S.O., F.R.C.V.S., A.V.C.,
Secunderabad, India.

THE administration of the leaves and other parts of *Solanum (atropa belladonna Datura Stramonium, Hyoscyamus niger)* was, and perhaps is, a resort of unscrupulous horsedealers to relieve temporarily the difficulty of breathing in broken wind. Administration by the mouth relieves the breathing in fifteen minutes, and its effects last a whole day.

The hypodermic injection of these drugs has the same effect, but the relief is afforded for a much shorter period.

A badly broken-winded Australian mare came into hospital for disposal; the character of the respirations was such as to elevate the croup with each double flank movement.

At 10.15 a.m., she was injected subcutaneously with *Hyoscinæ Hydrobromidi* grs.; and ʒiv. of water.

10.25 a.m. Animal, which had previously been feeding hay, ceases to feed and yawns continuously.

10.30 a.m. Breathing considerably improved, double flank respiration almost unnoticeable, no movements of the croup

- 10.35 a.m. Animal begins to sweat.
10.45 a.m. Bathed in sweat, throwing up the head with spasmodic jerks and stamping with fore feet.
10.55 a.m. Becoming quieter, still dripping with sweat. Breathing almost normal, pupils widely dilated, very cold under the arms.
11.0 a.m. Had the animal trotted; breathing remains practically normal.
11.15 a.m. Sweating has ceased, animal quiet. Breathing normal.
11.45 a.m. Animal dry, pupils widely dilated, quite quiet.
3.15 p.m. Has refused food, but with the exception of the dilated pupils is to all appearance normal.
7.15 p.m. The breathing is just commencing to assume the characteristics of *Emphysema* of lungs. Has eaten a mash.
9.15 p.m. Double flank action is resumed.
Dilatation of pupils lasted three days.
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Abstracts.

THE POSSIBLE USE OF *AZOLLA FILICULOIDES* AS A DETERRENT TO ANOPHELINE BREEDING.

BY CAPTAIN MALCOLM E. MACGREGOR.

Royal Army Medical Corps.

Officer in Charge, Entomological Laboratory, Sandwich, Kent.

ONE of the activities of this laboratory during the past summer has been the careful study of anopheline breeding places in regard to the association of the larvæ with the common water weeds of this locality, to see whether there are any weeds inimical to the larval development.

In this work I have had the help of Captain G. Bryce, R.A.M.C., and his expert botanical knowledge. Captain Bryce while he was here collected a very large number of water weeds from the ponds in and around Sandwich, and prepared named specimens for the laboratory. Most of the weeds were subsequently studied individually as to their influence, if any, upon the development of anopheline larvæ in our artificial anopheline breeding ponds.

None of these plants were found, however, to have any marked effect one way or another upon the development, although our records show that the larvæ certainly prefer some to others.

Later, in a strip of dyke about a mile from the laboratory *Azolla filiculoides* was found to be growing luxuriantly, and forming a veritable carpet over the water surface. I had some of this plant brought to the laboratory and tested in the same way on the anopheline larvæ, but it too had no effect on the development.

The plant, which is exceedingly beautiful, being at some times of the year green, and at others of a magenta colour, was placed in one of our anopheline breeding tanks simply because of its ornamental qualities. The plant spreads rapidly, and in a week it had completely covered the surface of the water. At this time of the year the numbers of the local anophelines (*A. maculipennis* and *A. bifurcatas*) were at their height, and natural oviposition took place every night in our breeding tanks, so that large numbers of larvæ were constantly being added to our supply. Whenever larvæ were wanted in the laboratory it was the custom to make a "dip" into one of the tanks. It soon became obvious that the numbers of larvæ in the tank containing the azolla were speedily reducing, and in about a fortnight when all that had been present previously had pupated and emerged no others were obtainable, in spite of the fact that the other tanks contained enormous numbers of larvæ at all ages.

Some of the water of the azolla tank and a supply of the weed was then placed in a large circular dish and about 100 larvæ added. A control dish with the same water and the weed *Entomomorpha intestinalis* was placed near by. The dishes were placed near the tanks and carefully observed each day. It was again found that the *A. filiculoides* had no detrimental effect on the larval development, but whereas in the control dish large numbers of ova were laid each night by the wild anophelines no ova was deposited in the dish containing the azolla which carpeted the surface of the water.

The azolla tank was left undisturbed throughout the season, except to be tested three times a week for the presence or absence of larvae. In spite of the fact that the wild anophelines were abundant and laid continuously in the other tanks no larvæ were ever found in the azolla tank.

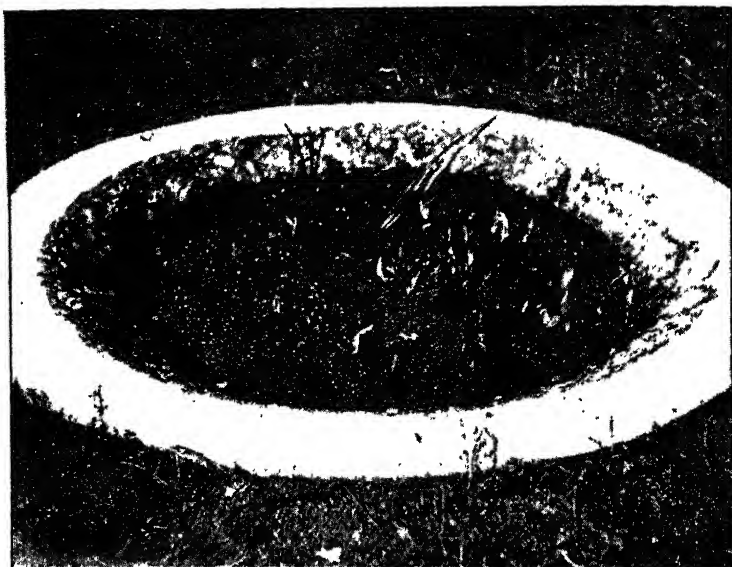
It is too late this season to do much more with the plant to gauge its possibilities in the natural ponds as a deterrent to anopheline breeding, by introducing this plant from the one source of supply I know of near Sandwich (and where, by the way, no larvæ have ever been found) into the other ponds where the anophelines breed in large numbers. I am, however, sure that this plant should prove next year, when this work can be done, of very great value.

A. filiculoides is, as I have already said, exceedingly beautiful, carpeting the water with its foliage as a light green or a bright magenta

pile according to the stage of growth in a remarkable manner. It is in this way very different to many of the common water plants of stagnant pools which so often, to the average person, are unattractive and unsightly forms of vegetation.

The plant belongs to the fern family, and is, I understand, a comparatively recently imported exotic from Canada.

It is a floating plant with compact leaves forming a spongy mass raised about $\frac{1}{2}$ inch above the water surface. The roots are thread-



Azolla filiculoides growing in one of the laboratory artificial breeding tanks. Note the water surface completely covered by the weed and the weed's close contact with the other water plants, which it is indeed in process of enveloping.

like and are about $1\frac{1}{2}$ ins. in length. There is no attachment either to the sides or bottom of the pond, and the plant may be gathered in masses by simply scooping it from the surface. In this manner a pond is very easily cleared of the weed if necessary. Its spreading powers are astonishing, and a single plant will, in the course of a fortnight cover a large area. In fact, the covering of the water surface seems one of the aims of the plant, the smaller weeds being speedily smothered and killed out.

It is upon this power of completely covering the water surface that its deterrent action to the breeding of anophelines rests. Apparently the female anopheline mosquito must have an open water surface on which to lay her eggs in nature.

I have found by experiment here that the anopheline ova, even when the embryo is fully developed within the egg, cannot withstand drying for much longer than six hours, and whereas *Stegomyia fasciata* will generally lay its eggs *upon* damp water weeds floating on the water surface, the anophelines always lay their eggs on the water surface itself, seeming to avoid weeds as much as possible.

It is probable, therefore, that the female anopheline regards an azolla covered pond as a highly dangerous place as far as her eggs are concerned, since the ova are not capable of resisting desiccation to any extent, and it would be difficult for her, if not impossible, to reach the water surface in such a pond.

I look forward, therefore, with interest to introducing *A. filiculoides* into some of the chief anopheline breeding ponds next year, and anticipate considerable success by the use of this plant in rendering ponds unsuitable breeding places that have served the anophelines admirably heretofore.

I am indebted to the Director of the Royal Botanical Gardens, Kew, for the following information concerning *Azolla filiculoides*, Lam.

"The genus *Azolla*, Lam., belongs to the family Salviniaceæ, which was formerly placed in the Rhizocarpæ, but now in the heterosporous pteridophyta.

"*A. filiculoides*, Lam., is a native of the western side of America from California to Chile, and in the Andes ascends to an altitude of 16,000 feet. An account by W. J. Campbell of its structure and life-history can be found in the 'Annals of Botany,' Vol. VII, pp. 155-187, tt. 7-9. It has been naturalised in many parts of Britain, and a résumé of this by A. S. Marsh has been published in the *Journal of Botany*, 1914, pp. 209-213, and supplementary notes in the same Journal by W. H. Burrell in 1914, p. 269, and H. Peirson, 1915, p. 308. It is propagated by means of male and female spores, which are produced freely, and towards the end of the season the plant turns from green to red, in a similar manner to the autumn tints of some trees."—*Journal of R.A.M.C.*

ANÆSTHETICS FOR ANIMALS.

THE undermentioned paragraph will interest members of our profession. Let us hope that it is published solely in the interest of the animal world, and that the same attention will be devoted to those who do not possess a veterinary diploma, but who operate upon animals notwithstanding.

Anæsthetics for Animals.

We have reason to believe the less responsible of the veterinary surgeons are altogether ignoring the provisions of the Animals (Anæsthetics) Act, which was passed some months ago, and we shall be glad to have any instance reported to us.—"John Bull," July 24.

THE ANTHELMINTIC AND INSECTICIDAL VALUE OF CARBON BISULPHIDE AGAINST GASTRO-INTESTINAL PARASITES OF THE HORSE.*

By MAURICE C. HALL, PH.D., D.V.M., MORGAN J. SMEAD, V.S., B.V.Sc.
AND CHARLES F. WOLF, D.V.M.*Biological and Research Laboratories, Parke, Davis and Co., Detroit, Mich.*

By critical experimental methods, *i.e.*, treatment followed by careful examination of the manure and post-mortem examination, it has been found by Hall (1917) that carbon bisulphide is apparently 100 per cent. effective against bots; by the same method, it has been found by Hall, Wilson and Wigdor (1918) that some of the common anthelmintics are not adequately effective against ascarids in the horse, even such drugs as oil of chenopodium, highly ascaricidal for ascarids in other hosts, falling far short of 10 per cent. efficacy. Using these same critical methods, we find that carbon bisulphide, in addition to being 100 per cent. effective in removing bots, is almost that effective in removing ascarids. This drug has been used heretofore against ascarids in the horse, but in the absence of critical tests, its real efficacy was a problematical quality. We are now able to report that in carbon bisulphide we have a dependable remedy for the refractory ascarid of the horse. This information fills a distinct gap in our knowledge of dependable treatments for parasites of the horse, and in connection with the findings of Hall, Wilson and Wigdor (1918) to the effect that oil of chenopodium, properly used, is approximately 100 per cent. effective against strongyles, cylicostomes and pinworms in the horse, it establishes the topic of anthelmintic treatment for the common parasites of the digestive tract of the horse on a sound basis of tested and dependable drugs.

Our method was the same as that used by Hall, Wilson and Wigdor. The horses were dosed by, and the fasting, feeding and care of manure supervised by, one of us (Smead). The examination of the manure for worms and bots passed and the post-mortem examination of the digestive tract were made by Hall, Smead and Wolf, assisted by J. R. Stafford. No effort was made to detect cylicostomes in the manure or to count them post-mortem. However, if cylicostomes had been present in the manure to any extent they would probably have been detected, and it is our opinion that practically none were passed.

Food was removed from eight horses at noon, March 10th, 1919, and the animals were given their first, or their only, treatment with carbon bisulphide in hard capsules about 8.30 the next morning. No purgatives were given. In view of the new data relative to the

*Read before the South-Eastern Michigan Veterinary Medical Association, Detroit, Mich., April 9, 1919, and reprinted from *The Journal of the American Veterinary Medical Association*, Vol. 8, No. 5.

time required for dead bots and worms to pass from a horse under these conditions, we give the protocols rather fully.

Horse No. 1094 was given 6 drams of carbon bisulphide in one dose. On the succeeding days, in their order, this horse passed the following: one bot, no ascarids; two bots, no ascarids; 58 bots, one ascarid; total 61 bots, one ascarid. The horse was killed the third day after treatment and had 105 dead bots and five dead ascarids in the large intestines on their way out. The drug removed 166 bots and six ascarids, leaving none in the stomach or small intestine. This horse had 85 pinworms, hundreds of *Strongylus* spp. and thousands of *Cylicostomum* spp. The treatment was therefore 100 per cent. effective against bots and ascarids and 0 per cent. effective against pinworms, *Strongylus* spp. and *Cylicostomum* spp. (We assume from the number of cylicostomes left, together with the failure to remove *Strongylus* and pinworms, that the treatment was an entire failure against cylicostomes, even though the manure was not closely examined to see if any of these were passed.) The stomach and small intestine were normal.

Horse No. 1093 was also given 6 drams of carbon bisulphide in one dose. On the succeeding day this horse passed bots as follows: No bots; 8 bots; 70 bots; 77 bots; 36 bots; 48 bots; 33 bots; 5 bots; 2 bots; total, 279 bots. This horse passed two ascarids on the third day after treatment and two or three at a later day; owing to a misunderstanding, exact records were not kept for these worms. The horse was killed the ninth day after treatment and had two bots in the double colon and no ascarids anywhere. This horse had one pinworm, hundreds of *Strongylus* spp. and some *Cylicostomum* spp. The treatment was therefore 100 per cent. effective against bots and ascarids and 0 per cent. effective against pinworms, *Strongylus* spp. and *Cylicostomum* spp. The stomach showed a healing inflamed area in the cardiac portion.

Horse No. 1092 was given 4 drams of carbon bisulphide at one dose, and this dose was repeated two hours later. On the succeeding day, in their order, this horse passed the following: No bots, no ascarids; no bots, one ascarid; no bots, four ascarids; total no bots, five ascarids. The horse was killed the third day after treatment, and had no bots anywhere; it had two live ascarids in the small intestine and 38 dead ones in the large intestine. There were nine *Strongylus* spp., some *Cylicostomum* spp. and no pinworms. The treatment was therefore over 95 per cent. effective against ascarids and 0 per cent. effective against *Strongylus* and *Cylicostomum* spp.: no data regarding bots and pinworms, as these parasites were not

present. Cardiac stomach was inflamed and showed adherent mucous exudate.

Horse No. 823 was also given two 4-dram doses of carbon bisulphide at a two-hour interval. On the succeeding days this horse passed the following: One bot, no ascarids; no bots, two ascarids; one bot, ten ascarids; one bot, four ascarids; no bots, six ascarids; no bots, three ascarids; no bots, no ascarids; no bots, one ascarid; total three bots, 26 ascarids. Subsequent to the eighth day after treatment, no bots or ascarids were passed. The horse was killed on the seventeenth day after treatment and had no bots or ascarids anywhere. There were hundreds of *Strongylus*, thousands of *Cylicostomum* and no pinworms. The treatment was therefore 100 per cent. effective against bots and ascarids, and 0 per cent. effective against *Strongylus* and *Cylicostomum*. In passing, it may be noted that the small number of bots present in this horse is correlated with the fact that this animal had not been on pasture the previous summer, but had been kept in the stable or allowed in a bare lot for exercise. The inflammation of the gastric musoca, following treatment, had almost entirely subsided.

Horse No. 1091 was also given two 4-dram doses of carbon bisulphide at a two-hour interval. On the succeeding days this horse passed bots as follows: 0, 7, 13, 6, 4, 2, 2, 0, 1, 0, 0, 0, 0, 0; total, 35 bots. This horse also passed three ascarids, but the exact date was not recorded. The horse was killed on the fourteenth day after treatment and had not bots or ascarids post-mortem; it had hundreds of *Strongylus* spp. and numerous *Cylicostomum* spp., but no pinworms. The treatment was therefore 100 per cent. effective against bots and ascarids, but 0 per cent. effective against *Strongylus* and, apparently, *Cylicostomum*. There are no conclusions regarding pinworms, as these were not present. There had been some inflammation in the cardiac stomach, but this had almost entirely subsided at the time of necropsy.

Horse No. 897 was also given two 4-dram doses of carbon bisulphide at a two-hour interval. On the succeeding days, this horse passed no bots. At some date it passed one or two ascarids, but, owing to a misunderstanding, no records of the number of worms or the date were kept. The horse was killed on the fourteenth day after treatment and was found to have no bots. There was one live ascarid in the small intestine. The horse had four pinworms, numerous *Strongylus* and some *Cylicostomum*. The treatment was not entirely successful against ascarids in this case, removing one or more and leaving one. This is probably due to the worm being in the lower ileum and the drug being largely absorbed before reach-

ing the site of the worm. The treatment was 0 per cent. effective against pinworms, *Strongylus* and, apparently, *Cylicostomum*. There are no conclusions in regard to bots, as there were none present. This freedom from bots is correlated with the fact that this animal had been kept off pasture the preceding summer. The stomach of this animal showed evidence of an inflammation, in the cardiac portion, that had almost entirely subsided.

Horse No. 1100 was given three doses of three drams each of carbon bisulphide at one-hour intervals. On the succeeding days this horse passed the following: No bots, no ascarids; 31 bots, four ascarids; 58 bots, two ascarids; 29 bots, no ascarids; 14 bots, no ascarids; 13 bots, no ascarids; total 145 bots, six ascarids. The horse was killed the sixth day after treatment and had 15 dead bots in the large intestine and no ascarids anywhere. There were four pinworms, hundreds of *Strongylus* spp. and some *Cylicostomum* spp. The treatment was therefore 100 per cent. effective against bots and ascarids and 0 per cent. effective against pinworms, *Strongylus* spp. and *Cylicostomum* spp. A considerable portion of the cardiac stomach was highly inflamed.

Horse No. 1106 was given the same treatment, three doses of three drams each at one-hour intervals. On the succeeding days this horse passed the following: No bots, no ascarids; 17 bots, one ascarid; 12 bots, one ascarid; seven bots, no ascarids; six bots, no ascarids; one bot, no ascarids; no bots, no ascarids; no bots, no ascarids; no bots, no ascarids; one bot, no ascarids; total 44 bots, two ascarids. After the tenth day no parasites were passed. The animal was killed on the seventeenth day. One dead bot was found in the double colon and no ascarids anywhere. There were numerous *Strongylus*, innumerable *Cylicostomum* and no pinworms. Treatment was therefore 100 per cent. effective against bots and ascarids, and 0 per cent. effective against *Strongylus* and, apparently, *Cylicostomum*. The inflammation of the gastric mucosa had almost entirely subsided.

A consideration of the foregoing shows the following:—

Carbon bisulphide has a dependable efficacy of approximately 100 per cent. against bots and ascarids, the two common and important parasites occurring in the anterior portion of the digestive tract, *i.e.*, the stomach and small intestine, of the horse. In our animals, the bots were mostly *Gastrophilus nasalis*, with a few *G. hemorrhoidalis*; the ascarids were the common *Ascaris equorum* (*A. megalocephala*). In our experiments, it was uniformly 100 per cent. effective against bots, removing all of 690 bots from the six infested animals, and usually 95 to 100 per cent. effective against

ascarids, removing (approximately) 91 of 94 worms from the eight infested animals, or almost 97 per cent.

Carbon bisulphide gives as good results in one 6-dram dose as in two 4-dram doses or three 3-dram doses, and it is likely that the smaller sum total of drug in the one dose is to be preferred to the greater total in several doses, especially as the gastric lesions seem less pronounced with the one dose. It is quite possible that further experiment will show that a single dose even smaller than six drams will be adequate. Dove (1918) found that young bots could be killed by carbon bisulphide in 45 minutes, while last-stage larvæ required almost $3\frac{1}{2}$ hours, *G. intestinalis* being more resistant than other species. The question as to whether carbon bisulphide in one dose remains in the stomach long enough to remove the bots, and perhaps remains as much as $3\frac{1}{2}$ hours, would seem to be answered in the affirmative by the success of our one-dose treatment.

Carbon bisulphide given without purgation will remove the bots, but they will usually not be found in the manure for the first 24 hours after treatment, and the maximum number are apt to be in the manure of the third day, and may be in that of the fourth day after treatment. Dead bots may be passed for 10 days and others may still be present in the large intestine 17 days after treatment. Where purgation is employed, bots may come away in the first 24 hours, according to Dove (1918), usually the following day, however, and may come away for five days, according to the findings of Hall (1917) and Dove (1918).

Ascarids usually come away on the second and third day, but may come away as late as the eighth day.

Carbon bisulphide is of no value against worms in the posterior portion of the digestive tract, the cecum, colon and rectum, *i.e.*, against pinworms, *Strongylus* and *Cylicostomum*. This is perhaps due to the rapid absorption of the drug in the stomach and small intestines, and this may account for the occasional escape of an ascarid located in the lower portion of the small intestine. The simultaneous administration of linseed oil might serve to carry the carbon bisulphide in solution down the intestine more rapidly, increasing its efficacy against ascarids. Whether it would cause the removal of any worms from the large intestine is doubtful. Hall (1919) has reported two experiments where horses given a 20-mil dose of carbon bisulphide, or two such doses at two-hour intervals, followed in $1\frac{1}{2}$ to $2\frac{1}{2}$ hours by 800 mils of linseed oil, entirely failed to remove any strongyles.

In this connection, it may be said that the carbon bisulphide is soluble in oils, but is practically insoluble in water; Dove (1918)

is in error in stating: "The carbon bisulphide, being soluble in water, evidently reaches all portions of the stomach, either as a gas or in solution." A common laboratory test for iodine is that employing a discrete undissolved bubble of CS_2 at the bottom of an aqueous solution.

Obviously, adequate anthelmintic treatment for removal of all the common species of worms and bots from the horse would require consecutive treatments with carbon bisulphide and oil of chenopodium, the two anthelmintics now known to be dependable for the purpose.

The lesion due to carbon bisulphide given in hard capsules consists in inflammation in the cardiac portion of the stomach, usually over an area the size of a man's hand or larger. This inflammation, when present, subsides almost entirely in the course of two weeks. The fact that horse No. 1094 had a normal stomach on the third day after treatment with one 6-dram dose, suggests that this single-dose treatment occasions less local damage than repeated doses; certainly the amount of toxic drug absorbed is less.

REFERENCES.

- DOVE, W. E. 1918. *Some Biological and Control Studies of* *Gastrophilus hæmorrhoidalis and other Bots in Horses*. U.S. Dept. Agric. Bull. 597, April 9, 52 pp., 5 pls., 4 text figs.
- HALL, MAURICE C. 1917. *Notes in regard to Bots, Gastrophilus spp.* J. Am. Vet. Med. Assn., v. 5, (2) Nov., pp. 177-184. 1919. *Practical Methods of Treatment for Worm Infestation*. J. Amer. Vet. Med. Ass., v. 8 (1), Apr., pp. 24-45, 1 fig.
- HALL, MAURICE, C.; ROBERT H. WILSON; and MEYER WIGDOR. 1918. *The Anthelmintic Treatment of Equine Intestinal Strongylidosis*. J. Am. Vet. Med. Ass., v. 7 (1), Oct., pp. 47-55. 1918. *Some Notes on the Treatment of Equine Ascariasis and Oxyuriasis*. J. Am. Vet. Med. Ass., v. 7 (1), Oct., pp. 56-57.

DESTROYING INCURABLE DOGS WITH CHLORAL AND STRYCHNINE.

By JAKOB.

THE Dutch veterinary surgeon, Jakob, describes the symptoms observed in two dogs destroyed by the above methods. The first weighed 11 kilos., the second 30 kilogrammes; the former received a rectal injection of 30 grammes of chloral dissolved in 60 grammes of gum arabic mucilage, being 1 gramme per kilo weight; the other received 2 grammes per kilo of live weight. When the anæsthetic effect was produced the animals were chloroformed. The different phases were as follows:—

First Dog:

Two minutes after injection the dog was calmer. Five minutes. The reflexes notably less. Six minutes: The palpebral reflex has disappeared; the pupillary reflex still exists; defecation; the tongue

hangs out of the mouth. Nine minutes: The dog sleeps peacefully and no longer hears anything; Ten minutes: Prolapse of the membrana nictitans; pulse still strong, 150 per minute; respiration, slightly accelerated but calm. Twelve minutes: Wadding soaked in chloroform is applied to the nasal cavities; the dog does not budge; its respirations accelerated and become more superficial; the pulse is feeble and intermittent. Twenty-two minutes: Suspension of respiration; the heart still beats lightly. Finally, the heart ceases to beat after twenty-four minutes.

Second Dog:

Twelve minutes: The dog cannot rise. Twenty minutes: Anæsthesia is complete; disappearance of the greater part of the reflexes; pulse 152°, slightly arhythmic; the dog no longer hears; respiration more frequent and more superficial. Twenty-two minutes: Profound sleep; chloroform is administered; the dog does not make the least movement; respiration deeper. Twenty-five minutes: Arrest of respiration and afterwards heart stops.

Three other dogs which received 1 to 2 grammes did not show peaceable sleep, but showed a period of 5 to 10 minutes' excitement, at the same time they set up howling. These dogs were not very ill, but in ailing subjects chloral is a very good narcotic. In order to obtain more rapid death in incurable subjects, the author practises intra-pulmonary or intra-cardiac injection of 15 to 35 centigrammes of nitrate of strychnine. Immediately after this injection, the dogs showed tetanic contractions over the whole body, with frequent short remissions. It may be noted that after death, one observed the absence of all the characteristic manifestations of death by strychnine and the carcase is indistinguishable from that of any other dog poisoned by any other toxic substance. Some dogs immediately after the disappearance of tetanic contractions, show violent clonic contractions of all the limbs; at the same time oscillatory nystagmus appears.—*Annales de Médecine Vétérinaire*.

G. M.

Review.

VETERINARY MATERIA MEDICA AND THERAPEUTICS. By KENELM WINSLOW, B.A.S., M.D.V., M.D., Major, M.C., U.S.A., with a chapter on Biological Therapeutics by Dr. A. Eichhorn. Eighth edition, revised. Published by American Veterinary Publishing Co., 9, South Clinton St., Chicago.

THE usefulness of this book is shown by the fact that it has gone into its eighth edition. It has been brought fully up to date in accord

with the 9th edition of the United States Pharmacopœia. Many prescriptions of value are given throughout the book, and the subjects of anthelmintics and biological therapy have received the attention of two authorities on the subject in the persons of Dr. Maurice C. Hall and Dr. A. Eichhorn. Articles on the thyroid and adrenal glands are of special interest, as is also the hive of instruction on lavage on pp. 522, 523, 524. The arrangement of the matter in the volume is similar to that followed in most materia medica works, but an exception occurs in the form of a welcome section of 73 pages on "General therapeutic measures."

An epitome of modern treatment of diseases forms a handy *aide-memoire* to the veterinarian.

The work is quite a handy one for us on this side of the water, and in some cases it may broaden our outlook and strengthen our hands against disease.

The matter of anæsthetics being much to the front at present, it may be interesting to give the following quotation:—The mortality is, in 3,162 chloroformisations, and in 16,302 etherisations in over a million cases in human practice (Hewitt). Chloroform is $3\frac{1}{2}$ times more depressant to nerve centres, 8 times more depressant to the heart, and causes 5 times more deaths than ether." But the author holds that all the advantages are in favour of chloroform except that of safety, and then he adds, "Ether is more expensive than chloroform, but cheaper than a funeral."

G. M

Personal.

At the recent meeting of the National Veterinary Association in Edinburgh it was announced that the *Veterinary Record* had been purchased from the present proprietors, and would in future be carried on as the official organ of the Association under the Editorship of Mr. Malcolm, F.R.C.V.S., the present Secretary. Subscription to the Association will include the subscription to the paper, a most excellent idea, which must be beneficial both to the National Association and to the *Veterinary Record*. With so energetic and moderate an editor as Mr. Malcolm is known to be, we are sure that the paper will have a very successful future, and with so large and influential a clientele there should be no difficulty in obtaining a full supply of valuable clinical and other material which cannot but be beneficial reading for the whole profession.

Congratulations to our distinguished colleague Inspector-General Fray, the Head of the Veterinary Service in the French Army, on being awarded the decoration of Commander of the Legion of Honour.

The difficulties which some of our Colonial workers have to deal with are exemplified by a paragraph from the report of Mr. F. R. Brandt, M.R.C.V.S., Chief Veterinary Officer for the Northern Provinces of Nigeria. Quoting from the Report, we read:—"For the prevention and spread of disease, segregation and isolation are attempted, and in some instances carried out in a fairly satisfactory manner; but to expect to deal with contagious disease in a country of about 250,000 square miles containing over half a million head of cattle, with a staff consisting of two veterinary officers and a number of natives who require constant supervision is absurd.

"When Nigeria is provided with an adequate staff of Veterinary Officers and a Research Laboratory where diseases can be investigated and vaccines and sera manufactured, some results may be expected."

PUBLISHERS' NOTICE.

Owing to the recent further increase in the cost of printing and paper, we are reluctantly compelled to advance the price of the VETERINARY JOURNAL from 1s. 6d. to 2s. per copy. The Annual Subscription will be 21s., post free, instead of 18s., and the annual combined subscription with the VETERINARY NEWS will be 32s., post free. These revised rates to take effect as from July 1, 1920.

No increased charge will be made for subscriptions already paid to the end of the current year.

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THE VETERINARY JOURNAL

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SEPTEMBER, 1920.

THE LATE MR. HARRY THOMPSON, M.R.C.V.S.

BORN in 1837, Mr. Harry Thompson has lived to see many revolutionary changes in the profession, and few men have done more to raise it in the respect of the agricultural community. In his own district, and indeed throughout the county of Cumberland there was no veterinary surgeon whose opinion was more sought after and relied upon, and the respect in which his memory was held was well illustrated by the large and mixed gathering which attended the last ceremony.

Mr. Thompson graduated from the New College in Edinburgh, 1860, and served on the Council of the Royal College of Veterinary Surgeons from 1893 to 1896. A man of strong opinions, he was often very difficult to convince, and at times his views on different diseases led him into discussions from which he did not always emerge triumphant, but for sincerity of purpose and for energy and tact in instilling into the agricultural community the value of utilising veterinary knowledge early in the ailments of stock he had very few equals.

Harry Thompson's opinion on this point in his own district in Cumberland was the last word. His position as Secretary for more than 50 years of the Aspatria Agricultural Co-operative Society (of which he was also a founder), and as lecturer in Veterinary Science at the Aspatria Agricultural College, gave him enormous local influence, and the token of respect given to him last year on his retirement showed his popularity. His wonderful vitality lasted almost to the finish, and it may literally be said that although he was in his 84th year, he died, as he wished he might do, "in harness."

Editorials.

SALARIES IN THE INDIAN CIVIL VETERINARY DEPARTMENT.

THE depreciation in the purchasing power of money, which has increased the cost of living by fully 150 per cent., has fallen very heavily on the shoulders of the man with the fixed income and the Government servant is especially hard hit. Particularly does this come hard upon the recently-joined and junior ranks who are married. A certain "white man's status" has to be kept up; for the greater part of the year two homes have to be maintained, and, frankly, the situation is becoming impossible. Not only in the Indian Civil Veterinary Service has the pinch been felt, but in every Service alike, only that in the Medical and other Civil Services, owing to greater numerical and influential strings being pulled, the position has already been amended to an increase of nearly 50 per cent. on the pre-war rates of pay.

Only recently the advertisement columns of our veterinary periodicals have had announcements of appointments for qualified and selected men at 500 rupees a month, rising by annual increments of 50 rupees a month to 1,500; a certain number being then selected to go on to 1,750 rupees monthly. This salary is practically the same as was received in 1902, the only difference being that in those days the successful applicant received 40 rupees a month annual increment instead of 50 as now. This, when one considers the enormously increased cost of living, is not at all in proportion, and it is not so much the increased annual increment which is needed as a fairer salary at the commencement. This, to have progressed in proportion to other things, should be at least 50 per cent. higher; *i.e.*, to commence with the newly-joined officer should receive 750 rupees a month. The Indian Civil Veterinary Department has, in bygone days, been much sought after as one of the plums of the profession, but at present salaries and present prices it must deteriorate, for all who know the East know full well the impossibility of maintaining a white man's status unless a fair monetary recompense is allowed. It will be well for intending aspirants for all Eastern billets to go slowly and make every enquiry before taking the final plunge, recollecting well that, provided the candidates do not come forward, the salaries *must* be raised and made sufficiently attractive. No Government would dare to leave the stock of a country like India without the supervision of the man with a British veterinary qualification. We must not forget what caused the present efficient and satisfactory position of the Royal Army Veterinary Corps. When the pay and position were unsatisfactory the smart young graduates boycotted the service, and

if the situation is unsatisfactory other Services will find a shortage of efficient candidates too.

SOUTH AFRICAN UNIVERSITY VETERINARY DEGREES.

OUR Colonies are giving us a lead in many things, and the Veterinary Profession has not escaped. The Australian Veterinary Faculty forms an integral part of the University both in Melbourne and in Sydney, and now the South African University has started its Veterinary School, too; and, with Sir Arnold Theiler as its leader, we may rest assured that it won't stand still, but will soon occupy the very important place it deserves. His address, published in this month's issue, forms most interesting reading and gives much food for thought. It displays over and over again the advantages of State Aid and of a University education, and makes one wonder why we in England are content to lag behind. Very soon, if we are not careful and do not come into line, the M.R.C.V.S. Diploma will be refused as a qualification to practice in the Colonies because of its lack of a University status, and it will be necessary to take the University degree in addition. It is quite time that our matriculation standing was again raised, so that we could say it was exactly the same as for human medicine, and there is much to be said in favour of the five years' course, "two years of which could be undertaken by any University or University College which provided the adequate staff and facilities for the teaching of the pure science subjects, and of Veterinary Anatomy and Physiology."

The Commission which sat in South Africa to consider the subject, recommended "that the final three years of more specialised professional training, following upon the two years' science curriculum or the three years' Bachelorate in Veterinary Biology, should lead to the degree of Bachelor of Veterinary Science in the University of South Africa, a professional degree enabling the graduate to follow the vocation of veterinarian in that country." A Doctorate of Veterinary Science of the University is also arranged for. This ought to make us think! South African Veterinary teaching will go ahead under the guidance of Sir Arnold Theiler just as much as Veterinary Research has done, for his name is a household word in every part of the world where veterinary science is practised.

ECONOMICAL USE OF FEEDING STUFFS.

IN these days, when foodstuffs are so costly, anything which will tend to reduce the forage accounts and yet give good results is worthy of study. A practical paper, by Mr. J. J. Griffith, B.Sc., under the above heading, which appears in this month's issue, gives much food

for thought to the practical man, and illustrates well how those who feed stock scientifically can save very considerably, not only in the quality of the mixture, but in the actual out-of-pocket cost. This subject, too, is of great importance to the veterinarian, as he is very frequently called upon to advise upon the feeding of stock. In addition, too, inferior unknown mixtures are often a source of dietetic disorders, leading to illnesses and want of condition which would not occur if the basis of the mixture was good and wholesome. Meals and mixtures give such opportunity for working off second and third quality stuff and, as the author of the article states, the price at which they are sold is, to say the least, exorbitant when the prices of the separate ingredients are taken in detail.

VETERINARY RESEARCH AND EDUCATION IN SOUTH AFRICA.

ADDRESS BY SIR ARNOLD THEILER, K.C.M.G.

Director of Veterinary Education and Research, on Degree Day, Pretoria, 9th April, 1920.

IT affords me great pleasure to have this opportunity of speaking for the first time in public on behalf of the newly-founded Veterinary Faculty, to explain its objects, its organisation, and its ideals. Veterinary science is, if not the last, at least one of the last sciences, the application of which has been recognised to be an important factor in the development of the stock-breeding resources of South Africa. The rough and ready methods used in the past to deal with plagues and diseases in stock have gradually given way to treatment based on scientific principles. As a result of this, the serious epizootics have been brought under control, and stock farming, which in earlier times was threatened by many perils, has finally become a safe undertaking. Everybody now realises that the future of South Africa lies in the development of agriculture, particularly in stock raising for the production of food and cloth to relieve the shortage of these commodities throughout the whole world. Improvement in the breed of cattle and sheep will come as a consequence of the increased demand, and of necessity the higher value of such stock will call for better care and attention as regards both the prevention and cure of disease. For some time past, farmers have recognised this, and have drawn the attention of the Government to the necessity of establishing a School of Veterinary Science in South Africa itself. They have realised that as far as stock diseases are concerned, this sub-continent has its own peculiar conditions, which are not met with in other parts of the world, and occur least of all in the older countries where the veterinary sciences are taught. They rightly conclude that no school in Europe can afford

South African students all the facilities required to make them thoroughly acquainted with their future work in South Africa.

In consequence of representations made by the Transvaal University College, the Minister of Education took up the question, and convened a meeting of persons interested in veterinary science, pure science, agriculture, and education, for the purpose of discussing the need for such a school, the advisability or otherwise of providing a course of training in South Africa, the extent to which university institutions generally could participate in such provision, and the centre at which the final professional stages of the course should be completed. This Commission realised that there was a shortage of veterinarians not only in South Africa, but throughout the world, and that the urgent and genuine necessity for meeting veterinary demands in South Africa was not likely to diminish in the future, but, on the contrary, was likely to increase with the inevitable expansion of the stock industry, and the more general application of intensive farming methods. The Commission, therefore, recommended the establishment of teaching facilities in this country, and set forth the advantages to be derived from such a course in the following words :

- (1) The training received in this country would naturally be specially adapted to the needs of the stock-raising community and would embrace a consideration of important diseases peculiar to South Africa, which are not dealt with elsewhere with the emphasis that South African conditions require.
- (2) It would afford facilities for South Africans desiring to enter the Veterinary profession, but who are at present debarred from doing so for financial or other reasons.
- (3) The knowledge of South African conditions, both social and economic, possessed by those living in this country is a valuable asset to the professional man trained in South Africa, which is not shared by men coming from other countries.
- (4) The due appreciation of the value of scientific research, and work of this character, is likely to develop more freely in the presence of a South African Veterinary College equipped with adequate facilities for education and research.
- (5) It is held that the establishment of a South African Veterinary School would fulfil the national and international aspirations and obligations of this country to take an adequate share in the study and investigation of stock diseases peculiar thereto, and contribute its quota to the solution of scientific problems in connection with tropical diseases generally. Such an

institution would in process of time come to take a permanent place as an international centre for the study of diseases of this character.

- (6) The training received by South African graduates would specially fit them for veterinary appointments throughout the African continent in places where a demand for such services may arise, as in British East Africa, Nyasaland, and Egypt, and probably also in India and the West Indies.

The Commission further recommended that the existing university institutions should participate in the education of veterinary students. A five years' course was finally considered to be necessary for complete training, two years of which could be undertaken by any University or University College that provided the adequate staff and facilities for the teaching of the pure science subjects, and of Veterinary Anatomy and Physiology. It also advocated the establishment of a Degree of Bachelor of Science in Veterinary subjects, which could be taken at a University or University College before entering upon the final three years' vocational professional training. It recommended that the final three years of more specialised professional training, following upon the two years Science curriculum or the three years Bachelorate in Veterinary Biology, should lead to the Degree of "Bachelor of Veterinary Science" in the University of South Africa, a professional degree enabling the graduate to follow the vocation of veterinarian in this country. The Commission furthermore recommended that provision be made for a Doctorate of Veterinary Science in the University.

With regard to the teaching of the professional subjects, the majority of the members of the Commission came to the conclusion that the most suitable establishment for this purpose was the Research Institute at Onderstepoort, and the "Majority Report" advocated that this Institute be converted into a "Faculty of Veterinary Science in the University of South Africa," the teaching staff to be so selected that the members would be at the same time actually engaged in the research work of the Institute.

In November last, the Government definitely decided to establish a Veterinary Faculty, and it accepted the "Majority Report" of the Commission. It decided that the faculty should form an integral part of the Transvaal University College, and as such of the University of South Africa, and that the third, fourth, and fifth years of the course be undertaken at Onderstepoort in conjunction with Veterinary Research. The Institute was to remain under the administration of the Department of Agriculture, which would make financial provision

both for the Research Institute and for the Faculty. In terms of the "Majority Report," the Cabinet decided that all the activities at Onderstepoort were to be under the ultimate control of one head.

The Premier, General Smuts, then asked me to undertake this control, and although at that time I had already made arrangements definitely to leave the service of the Government, I could not refuse to accept the task of organising the new undertaking, and thus show my sympathy with the South African student, and the educational ideals of the country.

This is a short outline of the history of the foundation and organisation of the new Faculty. In proposing the Faculty, the Commission appointed by the Minister aimed at a high standard of training. As already stated, a five years' course is contemplated, since even within the ranks of the profession itself it is felt that the period of training given in the past in the overseas schools is insufficient, particularly in view of special South African requirements. The Commission clearly realised that the veterinarian required in South Africa, and, indeed, in the whole sub-tropical and tropical world, would generally not be the private practitioner who attended the individual animal, but rather an officer in Government employ, who would apply the laws for the prevention of plague, and utilise his scientific training for the study of disease and of methods for eradication and control. In other words, although the practitioner training would be included, the South African students would have to be primarily equipped for research, and it is this view which determined the Commission to recommend provision for a more extensive instruction in the general sciences, the establishment of a science degree, the subsequent special training in connection with the Research Institute, and the creation of a Doctorate of Veterinary Science.

This new departure involved in combining research and teaching must be considered an excellent one, and South African farmers will in due time reap the full benefit of the extension of the activities of the Research Institute. The allotment of the subjects for research will be so arranged that they will fit in with the teaching function of the corresponding officer. On the one hand, the research officer will, by teaching, remain in constant touch with the literature of his subject as a whole, while on the other hand, the student will receive instruction from a teacher who masters his subject from the research point of view as well. Indeed, the combination of the two functions will be of the greatest benefit to research itself, and I venture to predict a period of constant progress in the near future, and the solution of problems which have hitherto proved refractory.

You will realise that under this arrangement the new school does not depend upon a large number of students to justify its existence, but will do useful work even if it should happen that there are very few students. The combination of research and education has a still further advantage, and one which will appeal to the people handling the purse strings. That is the saving of expense both in the construction of the new establishment and in subsequent current expenditure. The Research Institute as it now stands no longer fulfils the requirements for routine and research in the Union. Both have taken tremendous strides during the past few years, and for some time past an extension of the establishment has been contemplated. This extension can now be so arranged that provision is made at the same time for the educational side. For many years the research staff has been inadequate and its augmentation is necessary. A small increase over the estimated number of research officers, and a skilful distribution of the work, will now provide an adequate teaching staff. The professorial staff can be large without being expensive, owing to the fact that each teacher is not paid exclusively for teaching, but is primarily paid as a research officer. From the point of view of the State, the new organisation thus affords every guarantee for effective research and education at a moderate expense. From the point of view of the student, it is the most ideal one to be found. The young South African veterinarian will be a member of the University, and as such will derive all the advantages that the University life can offer. Students of the different faculties will meet on common ground and will rub shoulders with men whom in the future they will help to shape the destiny of the country. Furthermore, the student in the Research Institute will, from the very beginning of his studies, live in a scientific atmosphere. He will participate in the investigations of the professors. He will be able to follow their research, and to sharpen his critical mind during the progress of the work itself. It is the training of the critical mind, so necessary for the interpretation of facts obtained by observation and experiment, that makes a successful scientist.

Hence the new institute will afford opportunities superior to those of any other veterinary institute in the world.

At the same time, however, I wish to point out that not all and sundry will be welcome into our realm of science. Indeed, from the very beginning, I wish to utter a grave word of warning to those who consider the study of Veterinary Science only as a lucrative investment. I appeal to the young South African as the future veterinarian who, above everything else, has the welfare of the country at heart; to the young man who has the altruistic desire to be useful to his

fellow citizens ; and to the man who loves science for science's sake, who will be satisfied with a decent living, and will labour to elucidate the problems which are as yet unsolved. In doing so he not only serves the interests of his particular branch of science, but of science in general. It must be made clear to our student that veterinary medicine is a biological science, that the laws applying to the wider "science in general" are again to be found in the more limited regions of veterinary science, and that in approaching his subject from this wider point of view, he will be in a position to promote both. Whilst our science does not lend itself to the accumulation of wealth, it offers all prospects for distinction not only in our own country, but in the scientific world at large. For the gifted few there are places on the Roll of Honour of Science, but every honest veterinarian can become a great benefactor to the farming community of his country. It is to the student with high ideals that I appeal, and I feel sure that he is to be found in the young South African.

Clinical Cases.

SOME ACCIDENTAL PARASITES OF THE EAR OF THE DOMESTICATED RABBIT AND GUINEA-PIG.

By A. W. NOEL PILLERS, F.R.C.V.S.,
Liverpool.

C. J. DAVIES, in a recent communication to the VETERINARY JOURNAL,* made some remarks upon canker of the ear of the rabbit which practically proved that he was dealing with a case other than *Psoroptes communis cuniculi*, the common cause of canker in this species. I do not think, however, that his diagram or text proves conclusively that he had found *Tyroglyphus longior*. Prior to publishing his note he forwarded me two slides containing acari taken from the ear of a rabbit. All the undamaged specimens proved to be *Glycyphagus domesticus* de Geer. This finding formed the subject of a note in this journal.† Since then I have received numerous samples of foods and slides with specimens taken from rabbits and guinea-pigs' ears. From the lengthy account given I think Mr. Davies has established the fact that these mites are important in causing a marked set-back in condition and also an otorrhœa ; a Havana buck, kindly forwarded for observation, has convinced me

* Davies, C. J., Some Observations on Canker in the Ear of Rabbits. VETERINARY JOURNAL, Vol. 76, No. 3, March, 1920, p. 86.

† *Glycyphagus domesticus* (de Geer), an Accidental Parasite in the Ear of the Domesticated Rabbit. VET. JOURNAL, Vol. 76, No. 4, April, 1920, p. 126.

upon these points. The mites mentioned below are found in farinaceous materials except where it is otherwise stated ; they may thus easily wander into the ear.

Systematic dressing of the ears with a weak liniment of carbolic acid, turpentine and tincture of opium in glycerin, and attention to the condition of the foods are troublesome, but satisfactory, measures against the irritation and infection.

The following photographs and brief notes are descriptive of the mites found :—

1. *Glycyphagus domesticus* de Geer was again encountered in the rabbit's ear, and also in the guinea-pig's. This species was illustrated in the previous record of its being found in the rabbit's ear.*

2. *Aleurobius farinæ*, Gervais. Several acari of this species were taken from the ear of the guinea-pig. I have encountered this mite several times in skin scrapings of horses.† Figs. 1 and 2 show the distinguishing features of both male and female.

Both the above mites belong to the family *Tyroglyphidæ*.

3. *Cheyletus eruditus*. A much larger mite was encountered in the guinea-pig's ear. It is a predaceous species belonging to the family *Cheyletidæ*. It feeds greedily upon *Aleurobius*, and is common in hay dust and seeds. Its bionomics and parthenogenesis have been fully described by Newstead and Duvall.‡ It has been blamed by Picaglia§ as causing a skin eruption of the horse. See Fig. 3.

4. A fourth species of mite was found on four occasions, always, however, in a somewhat damaged condition. Prof. R. Newstead, F.R.S., who kindly examined some preparations of it, placed it in the family *Parasitidæ*, sub-family *Parasitinæ* near genus *Hyletastes*. Members of this genus are found upon certain beetles, and a few occur in moss. A fairly good specimen is shown in Fig. 4.

5. In one case several minute apterous insects were collected from the ear of a doe rabbit which had previously yielded acari. The specimens were damaged, and Prof. Newstead could only place them in the genus *Achorutes* of the Natural Order Collembola. The members of this group are found on grass, decaying wood, and in similar positions.

* *Glycyphagus domesticus* (de Geer), an Accidental Parasite in the Ear of the Domesticated Rabbit. VET. JOURNAL, Vol. 76, p. 126, 1920.

† On the Occurrence of *Aleurobius farinæ* (de Geer) in Skin Scrapings of Horses. Vet. Record, Vol. xxxii., 1919, p. 22. London.

‡ Newstead and Duvall, Reports of the Grain Pests (War) Committee. Royal Society, London, No. 2, p. 10.

§ Picaglia, quoted by Raillet, A., "Traite de Zoologie Médicale et Agricole," 2^e éme Edition. Paris, 1895, p. 696.

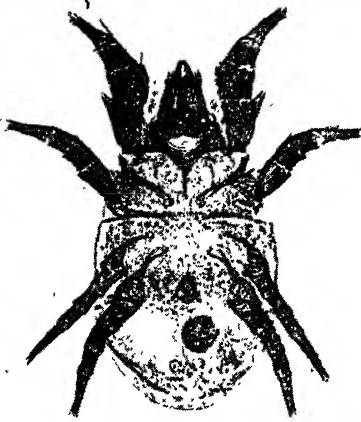


Fig 1.

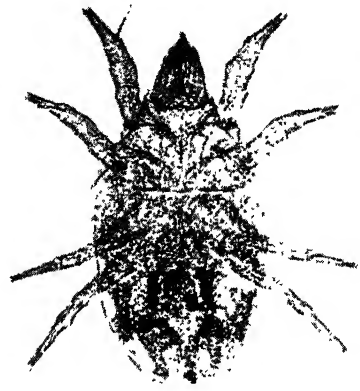


Fig 2.



Fig 5.

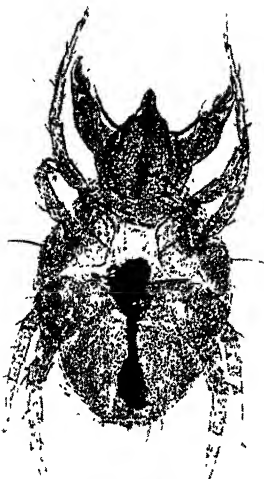


Fig 3.

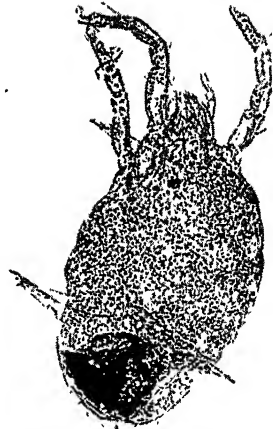


Fig 4.

FIG. 1.—*Aleurobius farinae*, male, ventral aspect. $\times 80$. Note spur on first limb.
 FIG. 2.—*Aleurobius farinae*, female, ventral aspect. $\times 80$.
 FIG. 3.—*Cheyletus eruditus* $\times 70$. FIG. 4.—Parasitinæ, ? near *Hyletastes*. $\times 140$.
 FIG. 5.—*Achorutes* sp. $\times 140$. Nat. Order. Collembola (Insecta).

SCHEDULE "A" (5).

AVERAGES OF HEIGHTS AND WEIGHTS OF FIFTEEN HORSES AND MULES
OF EACH CLASS.

Class.	Height.	Weight.
Heavy Draught	16 hands	1,282 lbs.
Light Draught	15.3 hands	1,188 lbs.
Riders (I)	15.3 hands	1,062 lbs.
Riders (II)	15.1½ hands and under ..	1,062 lbs.
Mules, Heavy Draught (average of five only)	17 hands	1,335 lbs.
Mules, Light Draught ..	15.2½ hands	1,087 lbs.

SCHEDULE "B" (2).

TABLE SHOWING AVERAGE TIMES OF CONSUMPTION OF WHOLE *v.*
CRUSHED OATS.

Horse.	Whole Oats.	Crushed Oats.
No. 1	11 minutes	17 minutes
2	14 "	14 "
3	14 "	14 "
4	17 "	18 "
5	11 "	11 "
6	21 "	21 "
7	12 "	14 "
8	13 "	12 "
9	16 "	14 "
10	15 "	16 "
11	25 "	19 "
12	15 "	15 "
13	14 "	22 "
14	27 "	24 "
15	20 "	14 "
16	16 "	17 "
17	14 "	18 "
18	20 "	20 "
19	11 "	12 "
20	23 "	18 "
21	17 "	9 "
22	19 "	13 "
23	29 "	20 "
24	12 "	15 "
25	27 "	15 "

[Average for whole oats, 17.3 minutes; crushed, 16.1 minutes. The time taken by mules was slightly longer, 19.1 minutes. Where equal parts of whole and crushed corn was given (1½ lbs. of each) the time taken by the horse was 14.9 minutes, and by the mule 17.36 minutes.]

product—erythrodextrin—being present. In the presence of the greater proportions of saliva, however, the conversion was complete. In all cases Fehling's solution gave a copious precipitate. These results were obtained both before and after feeding. The quantities of saliva necessary to effect complete reduction were considerably greater than in the case of human saliva, but the presence of a starch-reducing enzyme was demonstrated in all cases.

It is probable that the discrepancy existing between the findings of this Institute and those of previous observers will be found due to the fact that the latter obtained saliva for testing by use of a Sialogogue, such as Pilocarpin, Arecolin, etc. A recent test has demonstrated that in the saliva collected by means of such reagents no ptyalin is found to exist.

APPENDIX "B" (3).

TABLE SHOWING DEGREE OF VITALITY POSSESSED BY OATS AFTER PASSAGE THROUGH INTESTINAL CANAL OF HORSE.

Equal quantities (8 lbs.) of the mixed fæces of 24 hours were taken from ten horses, each being separately sown (by lightly digging the faecal matter in) on ten plots of prepared earth. The oats which germinated were then counted. The numbers of oats germinating seem to vary within wide limits, but the proportion borne to the approximate number of oats ingested—approximately 160,000 grains in 8 lbs. of oats—is very small. Such differences as exist are due probably to differing degrees of efficiency of mastication in the animals under observation. (Where a horse's teeth were believed to be out of order, but no competent dental inspection was available, this germination test might be made to furnish a rough gauge of the state of the teeth.)

AVERAGE NUMBER OF VITAL OATS IN 24 HOURS OUTPUT.

Horse No. 12	..	..	15	Horse No. 42	..	..	110
Horse No. 36	..	..	22	Horse No. 45	..	..	37
Horse No. 37	..	..	21	Horse No. 47	..	..	120
Horse No. 38	..	..	28	Horse No. 48	..	..	22
Horse No. 39	..	..	10	Horse No. 49	..	..	27
				Horse No. 50	..	..	57

SCHEDULE "B" (4).

TABLE SHOWING PERCENTAGE OF OATS—WHEN FED UNCRUSHED—WHICH PASS THROUGH THE BOWEL OF THE HORSE AND ESCAPE DIGESTION.

Coloured oats of known number (2,050) were used in this test, and their times of first and last appearance noted as shown :—

Horse No.	First Seen.	Last Seen.	% of Whole Oat.
11	22 $\frac{1}{2}$ hours	132 hours	.098
11	22 $\frac{1}{2}$ "	123 "	.1463
12	21 $\frac{1}{2}$ "	96 $\frac{1}{2}$ "	.975
32	20 "	118 "	.631
32	20 "	101 "	2.10
32	20 "	82 "	2.24
32	20 "	68 "	1.6
32	17 $\frac{1}{2}$ "	74 "	.68
32	19 hrs. 45 mins.	77 "	.146
32	21 hours	68 "	.390
32	20 "	66 "	.780
32	20 "	56 "	.390
32	19 "	68 "	.195
33	22 "	78 "	.536
33	20 "	94 "	1.073
33	22 "	95 "	1.12
33	21 "	100 "	.635
33	20 "	87 "	1.12
33	20 "	81 "	.243
33	19 hrs. 35 mins.	84 "	.097
33	20 hours	60 "	.390
33	20 "	68 "	1.21
33	20 "	61 "	.439
33	18 "	68 "	.097

SCHEDULE "B" (5).

SHOWING THE RESULT OF ABSENCE OF TEETH-ACTION UPON THE
DIGESTION OF THE OAT.

In order to determine this point two horses received a bolus containing about 1,000 coloured oat-grains. By introduction in this way into the stomach direct the effects of mastication were avoided.

				No. 52	No 57
July 23	..	..	Between hours of 6 a.m. and 9 a.m.	2	nil
" 23	..	..	" " 9 " and 12 noon	1	2
" 23	..	..	" " 12 noon and 3 p.m.	nil	6
" 23	..	..	" " 3 p.m. and 6 p.m.	14	1
" 23	..	..	" " 6 p.m. and 9 p.m.	0	nil
" 23-24	..	..	" " 6 a.m. and 9 a.m.	13	12
" 24	..	..	" " 9 a.m. and noon	13	13
" 12	..	..	" " 12 noon and 3 p.m.	34	24
" 12	..	..	" " 3 p.m. and 6 p.m.	20	33
" 12	..	..	" " 6 p.m. and 9 p.m.	158	24
" 24-25	..	..	" " 3 p.m. and 6 a.m.	110	72
" 25	..	..	" " 6 a.m. and 9 a.m.	—	—
" 25	..	..	" " 9 a.m. and noon	69	65
" 25	..	..	" " 6 p.m. and 9 p.m.	42	34
" 25	..	..	" " 3 p.m. and 6 p.m.	37	24
" 25-26	..	..	" " 9 p.m. and 6 a.m.	80	75
" 25-26	..	..	" " 6 a.m. and 9 a.m.	48	36
" 25-26	..	..	" " 9 a.m. and noon	55	42

Whole coloured grain began to appear at times as shown in the table. During the test the horses were fed at the usual times and in the usual manner. The bolus was administered at 4 p.m. on July 22.

The experiment was discontinued at this point, as no evidence of any digestive action upon the grains appeared to be exerted, all the oats as shown in the above columns being whole and no signs of disintegration having occurred.

APPENDIX "C" (1).

AVERAGE TIME IN MINUTES TAKEN IN CONSUMING FEEDS.

Horse No.	FRIDAY.		MONDAY.		TUESDAY.		WEDNESDAY.	
	4 lbs. of whole Oats, 2 lbs. Chaff at each feed.		4 lbs. Crushed Oats, 2 lbs. Chaff at each feed.		4 lb. Whole Oats each feed. No Chaff.		4 lbs Crushed Oats each feed. No Chaff.	
	M.	E.	M.	E.	M.	E.	M.	E.
12	53	53	51	48	26	23	22	22
54	52	53	42	46	22	19	16	14
55	47	50	42	41	20	18	20	19
50	54	53	72	55	46	25	43	29
49	40	41	35	31	16	15	12	11
52	34	30	34	34	13	13	12	12
57	52	52	70	49	24	22	21	20
53	50	54	48	50	23	19	23	19
58	51	52	49	42	21	17	19	21

AVERAGE TIME.	{ Morning feed of whole grain—chaff ..	48 mins.
	{ Evening feed of whole grain—chaff ..	47 mins.
	{ Morning feed of crushed grain—chaff ..	50 mins.
	{ Evening feed of crushed grain—chaff ..	44 mins.
	{ Morning feed of whole grain without chaff ..	23½ mins.
	{ Evening feed of whole grain without chaff ..	19 mins.
	{ Morning feed of crushed grain without chaff ..	21 mins.
	{ Evening feed of crushed grain without chaff ..	18½ mins.

Daily average time with chaff, 47 minutes.

Daily average time without chaff, 20 minutes.

SCHEDULE "C" (5).

EFFECT OF EXERCISE ON THE RATE OF PASSAGE OF INGESTA THROUGH THE DIGESTIVE TRACT.

Four horses (Nos. 12, 49, 53 and 54) were given $\frac{1}{4}$ lb. of red oats (stained by carbol fuchsin) at 6 a.m. (19.8.19). Two of these (12 and 49) were given sharp exercise for two hours and made to sweat profusely (9.30 a.m. till 11.30 a.m.).

The fæces were collected and marked at understated times and the red oats picked out :—

Time examined.	12	49	53	54
12th hour	Nil	Nil	Nil	Nil
15th hour	7 red oats	2 red oats	1 red oat	Nil
18th hour	No fæces passed	18 red oats	No fæces passed	Nil
21st hour	50 red oats in $\frac{1}{2}$ lb. fæces	23 red oats	1 red oat	No fæces passed
24th hour	Not counted further	Not counted further	1 red oat	Nil
27th hour	..	..	18 red oats	18 red oats
30th hour	..	..	Not counted further	33 red oats in $\frac{1}{2}$ lb. of fæces.
	Horses exercised.		Horses not exercised.	

The above table shows the accelerating effect of exercise upon the gastro-intestinal contents. It appears possible that a connection may frequently be shown to exist between poor condition, general unthriftiness, and this factor of the time taken in the transit of ingesta through the bowel. Observations controlling the point are now in hand.

SCHEDULE "C" (6).

TO TEST THE RATE OF FEEDING OF BRAN AND OATS IN COMPARISON WITH CHAFF AND OATS.

Eight horses (Nos. 12, 54, 55, 56, 49, 53, 58 and 52) were fed on bran and oats, having 2 lbs. of each. Same horses fed on a different day, at same time of day, on chaff and oats, having 2 lbs. of each.

TIME TABLE.

No. of Horses.	Bran-Oats.	Chaff-Oats.
12	24 mins.	35 mins.
54	17 "	28 "
55	20 "	22 "
56	32 "	41 "
49	13 "	24 "
53	20 "	33 "
58	19 "	29 "
52	13 "	24 "
	—	—
Totals ..	158 mins.	236 mins
Average time for each horse	19.75 mins.	29.50 mins.

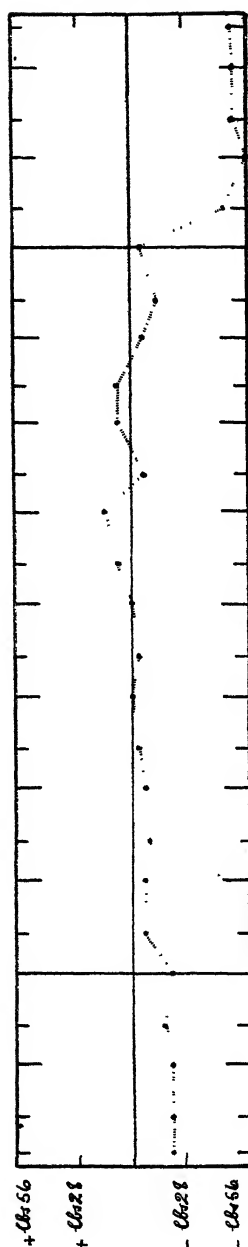
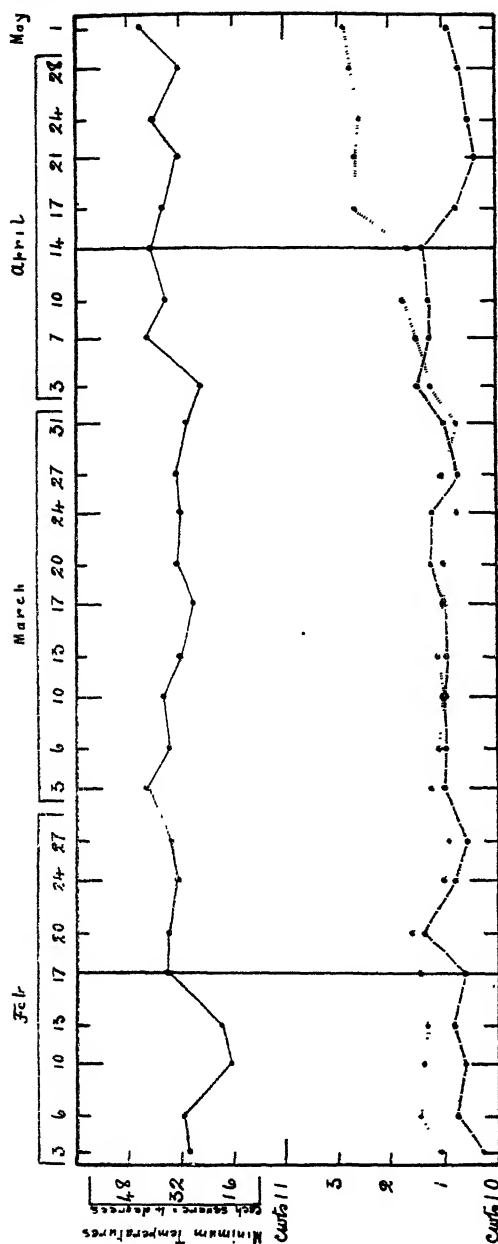


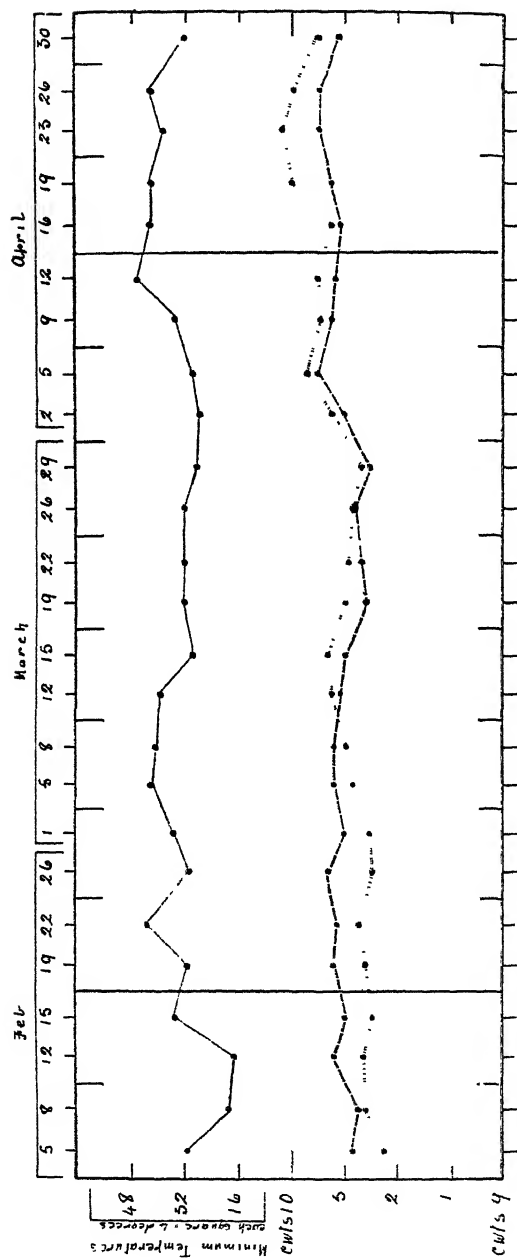
CHART NO. I.

This Chart shows the average weights of ten Test horses (the heavier dotted line) fed upon boiled food, and ten Control horses (the lighter dotted line) receiving an equal (original) weight of raw food. A preliminary period of observation, Feb. 3 to 17, was observed to allow normal conditions to become established. The experiment commenced Feb. 17 and conditions of feeding were reversed on April 14, weights being recorded every 3 and 4 days.

CHART NO. II.

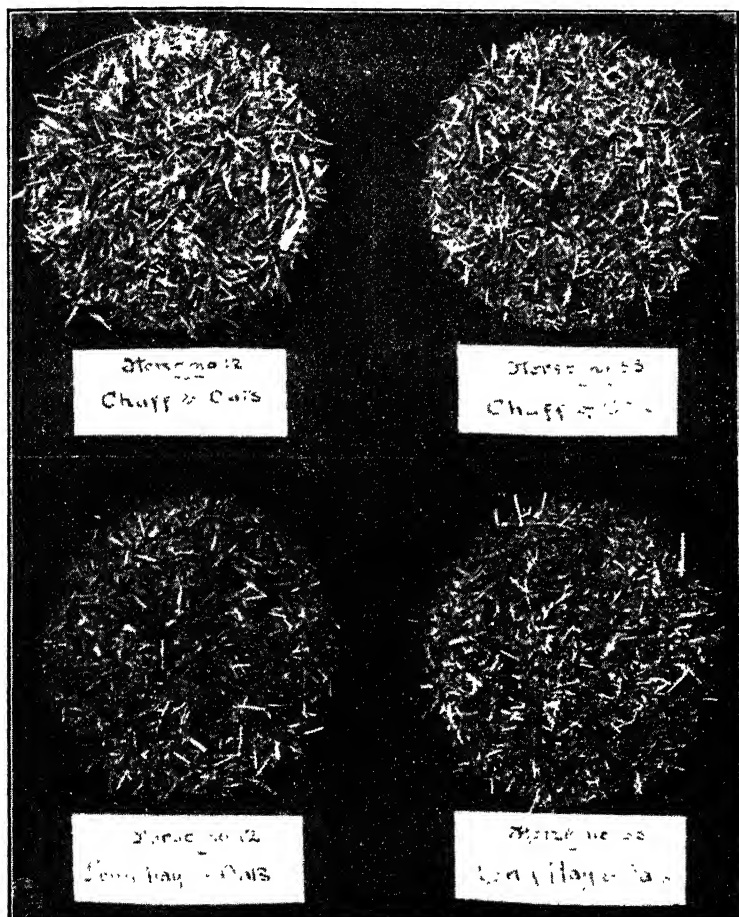
This Difference Curve is intended to shew the variations occurring in the weights of the Test and Control animals, the approach to or receding from the horizontal line shewing the degree of difference—in pounds—at any given date.

SCHEDULE B1.

CRUSHED *v.* WHOLE OATS

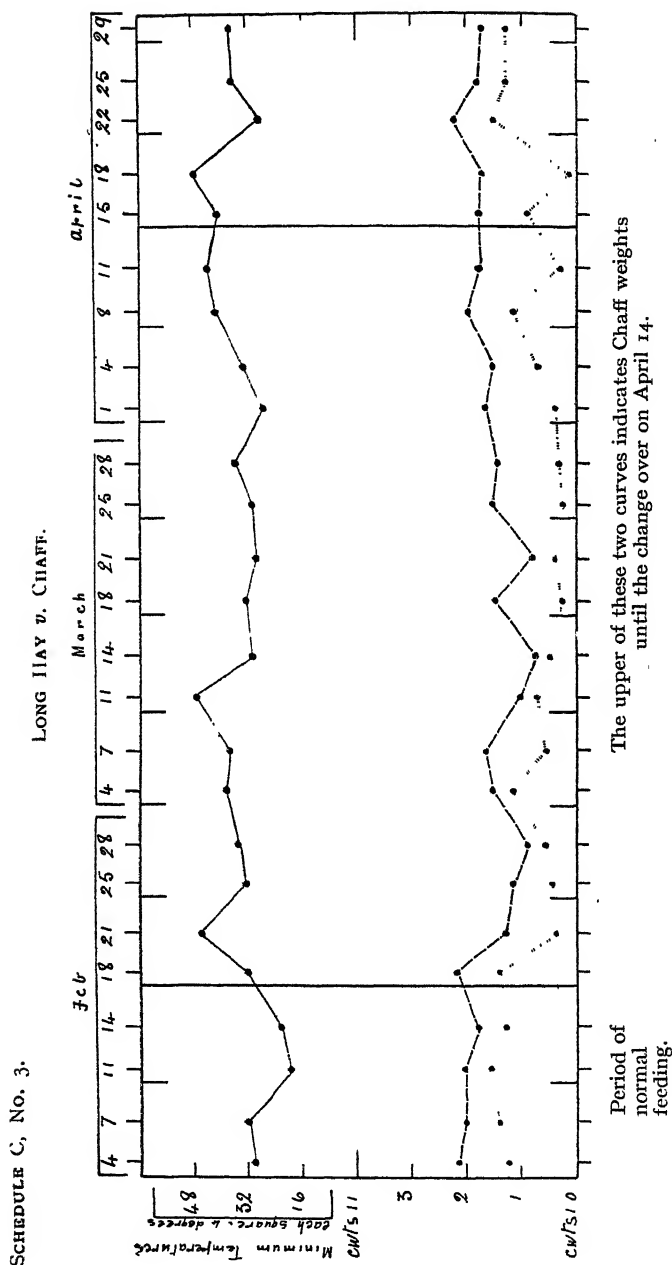
The Heavy Curve indicates Whole Oats until the change over on April 14.

C2.

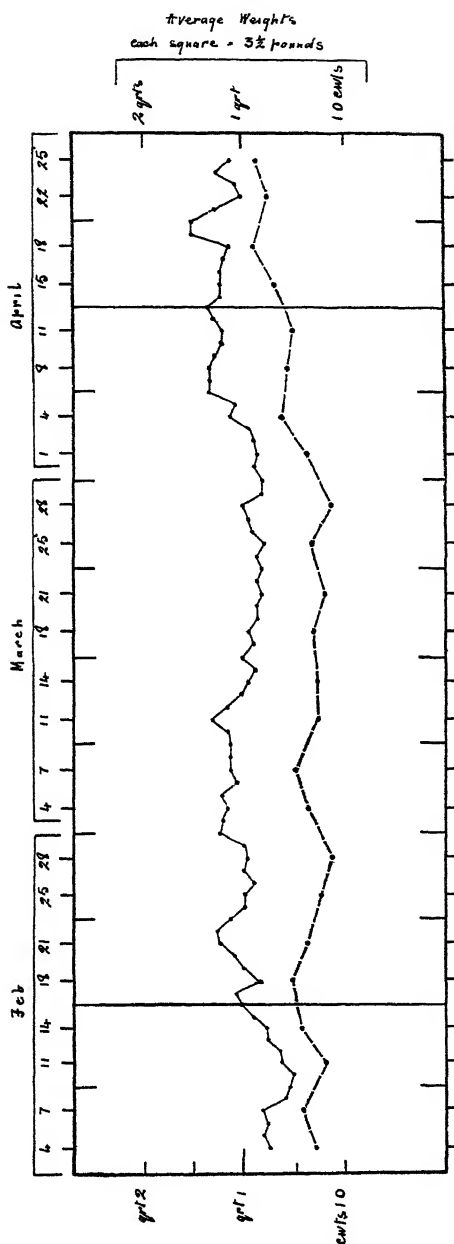


Photograph of residual fibre in fæces of horses after feeding with Long Hay, and Chaff, respectively.

The Chaff was cut from the same bale of Hay as fed in the long state



SCHEDULE C4.



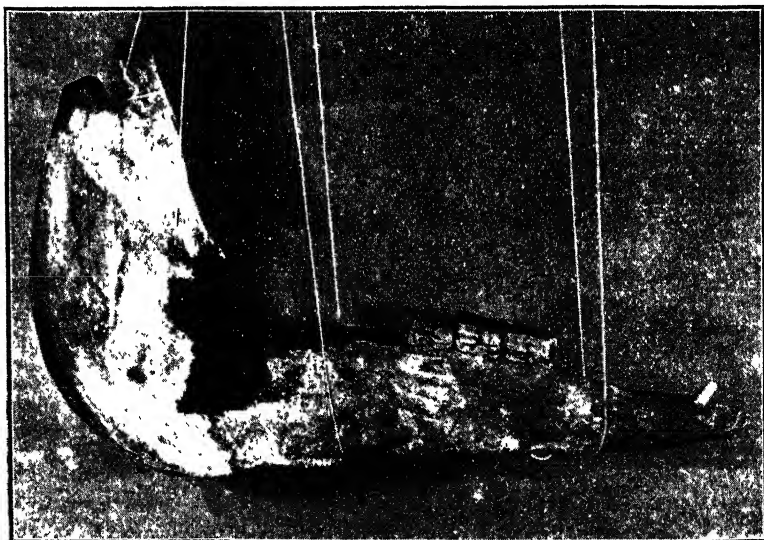
A Composite Chart of Weights of 60 Test and Control Horses, tending to shew—within wide limits—a possible correspondence between an increase of daily temperature (top curve) and an increase of body-weight (bottom curve).

A CURIOUS CASE.

By G MAYALL, M.R.C.V.S.,
Bolton.

ON May 19 I was called to attend a 7-year-old cart gelding for a swollen right lower jaw bone and face, and which was dropping clotted blood from his mouth on the floor of the loose box. I found the jaw swollen as stated and saw the blood clots on the stall floor. The horse strongly resented any examination of the mouth, but I managed to syringe the inside of the right cheek and the back of the pharynx out well with dilute Bacterol (Menley & James) and left a large pot of boracic electuary to be smeared in the mouth. There was also a swelling on the left side of the horse which was raised and flattened, about 6 inches in diameter, and situated over the ninth rib. Some emollient liniment was left to be rubbed on the swelling.

On May 25 the horse was reported no better, so it was decided to cast him, and thinking I should have a defective molar to deal with, I took my tooth rasp, forceps, gag and chloroform muzzle. The subject was cast on the off side and the gag inserted, and on examining the mouth I found the inside of the right cheek considerably abraded, and the edges of the molars sharp, but the teeth themselves were firm and with no interdental spaces. I rasped them well, and caused some slight hæmorrhage in so doing; I then syringed and swabbed the mouth out with antiseptic, let him up and advised that he be let out to graze. This was done right away and he proceeded to eat the grass very well. At no time during the illness did the horse "quid" his food. I



visited him further on May 27, June 1-8 and 15, dressed the outside of his jaw several times with iodine ointment and gave him laxatives and sedative electuaries. Externally the swelling reminded me of a malignant oedema case, but on June 8 it had burst and was discharging dirty sanious pus (not of a yellow colour, however). Although the horse kept on eating to the last, he gradually got thinner and thinner and died on June 30. The parting with the clots of blood recurred from June 8.

P.M. revealed the right cheek abraded inside, all the teeth intact, but the jaw bone smashed as illustrated in the accompanying photo. The ninth rib was broken and eaten away for about an inch and a tumour of organised blood opposite it and bulging out the peritoneum. The blood tumour weighed 1 lb. 8 oz. A big ante-mortem clot of blood in the heart weighed 1 lb. 10 ozs. Without the post-mortem the case might have been taken for one of alveolar disease. The horse keeping on eating until the last somewhat negated this and the examination when cast revealed no dental trouble.

I have seen one other similar case due to the point of a shaft catching the side of a horse's under jaw and the sites of the injuries, too, are the places where an unruly horse sometimes gets a smack with the hammer when being shod, and this horse was a very awkward one. The three teeth absent in the photo came out during the process of boiling. I could gain no history of any accident or injury, but I think that some cases of sudden swelling in horse's heads are due to external blows, either accidental or otherwise.

OVARO-HYSTERECTOMY OF A GANGRENOUS UTERUS.

By J. B. WALKER, M.R.C.V.S.,

Slough.

Subject.—Aberdeen terrier bitch, three years old.

History.—Bitch, one month in whelp, was run over by a motor car on November 25; as she did not seem any the worse for the accident no professional advice was sought. On December 9, as the bitch did not appear to be quite herself, a 'phone message was sent asking me to call. The bitch appeared fairly normal, except that abdominal walls were somewhat tense, and that uterus was considerably enlarged, although no definite foetus could be felt. The temperature at this visit was 101.4.

The bitch continued without any change noticeable to the owner until December 12, on which day at 9 p.m., a telephone message was received to say that bitch appeared very uneasy, and had been sick and thirsty all day.

On arrival, symptoms of severe abdominal pain were noticeable ; there was a stinking coffee-coloured discharge from vagina, and pains indistinguishable from labour pains were to be seen.

On examination it was found that os uteri was only sufficiently open to permit the introduction of a very small probe. From external manipulation one could diagnose the presence of a large amount of fluid in both horns of the uterus. The temperature was 104.

It was decided that the accident had caused the death of the fœtuses, and subsequent mortification of the uterus, and that the only hope of saving the bitch was to perform ovaro-hysterectomy.

The bitch was therefore removed at once to my infirmary, and operated on immediately on arrival.

Operation.—The bitch was placed in the dorsal position on operating table, and skin was shaved and painted with tincture of iodine. Chloroform was administered ; skin and abdominal muscles divided in the midline. A pair of retractors applied to divided surfaces, and peritoneum incised a little to left of median line.

It was then observed that both horns of the uterus were gangrenous and that the peritoneum in apposition to the horns was acutely inflamed.

The horns of the uterus were divided from the ovaries and drawn through the wound, which was protected from contamination by a pad of sterile cotton wool. The cornua were then divided from the body, great care being taken to prevent any fluid escaping into the abdominal cavity. The edges of body of uterus were turned inwards and secured with a purse suture, the body afterwards being attached by a suture to the abdominal wall.

The peritoneum was washed with a 2½ per cent. solution of tincture of Iodine, the stump of body of uterus being dressed with a 10 per cent. solution of same agent.

The wound was now stitched up, three drainage tubes being introduced as follows : (1) At posterior end of wound, immediately under the stump of the uterus ; (2) at centre of wound ; (3) at anterior extremity of wound.

After the stitched areas had been painted over with iodoformed collodion, a dry antiseptic pad and supporting bandage were applied. The remnant of genitary passage was syringed with a 1-1,000 solution of Chinosol, and a pessary of salol and iodoform introduced.

Six hours after the operation, the temperature was 102 ; the bitch appeared quite comfortable, and took a little nourishment of her own accord.

At twelve hours, the bandage was removed ; very little discharge had occurred, and even that was of quite a mild nature. The surfaces

of the wound in apposition to the drainage tubes were dressed with tincture of iodine.

At twenty-four hours the two anterior drainage tubes were removed, and the edges of the wound dressed as before. A slight discharge was still escaping from the posterior tube.

The progress continued unchecked, and on the fifth day the last tube was removed, the wound closing perfectly.

The discharge from vagina, which had been rather copious and disagreeable, diminished gradually and was not noticeable after the fifth day.

A liquid diet was maintained for a week ; the patient gave all the assistance in this direction that could be desired.

Recovery was complete in three weeks, the bitch leaving for home on January 3.

PATENT ANTERIOR FONTANELLE IN A LITTER OF BERKSHIRE PIGS.

By J. F. D. TUTT, M.R.C.V.S., F.R.M.S., F.Z.S.

Winchester.

THE occurrence of patent fontanelle in the newly-born in the case of domesticated animals must be regarded as rare, and no reference as to their existence either before or after birth appears to have been made in any current anatomical treatise on veterinary anatomy.

In human anatomy, and midwifery, the fontanelles are important, and are six in number, some remaining patent after birth for a considerable period, the anterior not closing till some time in the first half of the second year, or even later.

The writer has known of patent fontanelle occurring in the calf, but has not before encountered a case in the pig, and this particular case appears rather unique, inasmuch that the whole litter was affected to the same degree.

The owner, in seeking advice, stated that six weeks previously one of his Berkshire sows had given birth to a litter (eight) of pigs that had " bumps " on their heads.

The elevation was semi-solid, and situated at the junction in the middle line of the parietals with the frontals.

Post-mortem on a dead pig easily showed the condition, the fontanelle being about the size of a threepenny piece, with underlying cerebral tissue and dura mater pressing up against it.

The majority of the pigs died, and those remaining never " did well " and were destroyed.

RUPTURE OF UTERUS IN A COW.—A WARNING.

BY HENRY B. EVE, M.R.C.V.S.

Folkestone.

Subject.—A half-bred shorthorn cow, about six years old, in fair condition.

History.—Some few weeks ago I was called to see the above, which was said to have been off her feed for some days, and constipated. The animal had calved twins, one alive, the other dead, delivered by his cowman with some difficulty about ten days ago; the latter was so clever that he never required the aid of a vet. for parturition or milk fever cases, or ordinary ailments, but he admitted he was clean “licked” with this cow, and was at a loss to understand the continual moaning and grunting. The owner and he had given various patent medicines—in fact, nearly a chemist’s shop. The cowman had removed the foetal membranes in his usual manner, namely, with a couple of thatch pegs, and twisted until he had got both cleansings away. The cow had ever since arched her back, strained and discharged from the vulva a brownish coloured fluid, which was foul stinking.

Examination.—The pulse was very weak, almost imperceptible; temperature, sub-normal; eyes sunken. On proceeding to examine the uterus, I found the os dilated, and a bit further on the left side towards the floor of the womb, a rupture large enough to admit my hand. I passed my hand through, and felt the bowels and bladder. On the right side I discovered the remains of some placental membranes which I removed manually. I then explained the condition to the owner, and assured him, with no little confidence, the cow would die, and felt chary about putting him to any expense in treating. However, we contracted for a fee, a guinea cash down, and I treated accordingly, the result of which gave me a very rude shock. It recovered in three weeks.

Treatment.—I mopped out the uterus with a tampon medicated with Chinosol and Ext. Belladonna solution, and instructed the cowman to do this twice daily as long as she lived; packed the same all round, and attached a string to tampon to remove; gave internally whisky, eggs, and milk and gruel, and stimulating drinks, ammon. carb., quinine, and vegetable tonics, and went home rejoicing that I had got the fee in advance.

Remarks.—I did not revisit as it was some distance in the country, and as I heard nothing, of course concluded she had died. Imagine my surprise when I saw the cowman a few days later, who laughed and said, “Well, Guv’nor, the old coo soon stopped moaning, and ain’t dead: we are fattening her for the butcher, and don’t mean to

breed from her again." I vowed then and there I would never express any other opinion in future but while "there is life there is hope."

N.B.—The rupture, I think, was caused by the hind legs of one of the calves, or else due to sloughing of the uterus.

Original Communications.

ECONOMICAL USE OF FEEDING STUFFS.

By J. J. GRIFFITH, B.Sc.,

Lecturer and Adviser in Agricultural Chemistry, University College of Wales.

THE proper selection and utilisation of feeding stuffs is at all times a matter of considerable economic interest to the farmer. At the present time the subject has acquired exceptional importance as a result of the great advance in the market prices of the feeding stuffs which farmers usually purchase. Further, the country is confronted with the necessity of husbanding its resources in all possible ways, especially in matters pertaining to the food supply.

In this leaflet attention is drawn to a few of the ways in which farmers might

- (a) use their home-grown foods to better advantage ;
- (b) make a more judicious selection of purchased feeding stuffs and thereby avoid incurring much wasteful expenditure.

FOOD CONSTITUENTS AND THEIR FUNCTIONS

(Or the different substances which foods contain and the use of each substance to the animal).

Every farmer knows from experience that there is a great variation in the feeding value of different foods usually supplied to farm stock. For instance, everyone knows that, as regards nutritive value, a ton of good hay is superior to a ton of cereal straw. But, in order to make the best and most profitable use of the feeding stuffs at his disposal, the farmer must acquire some knowledge of their chemical composition.

Chemical analysis shows that all feeding stuffs contain the following ingredients :—

Water.

Albuminoids—Sometimes called proteins or flesh-formers.

Oil.—Also called fat.

Carbohydrates—A name given to a class of substances of which starch and sugar are the most important members.

Fibre—For practical purposes this may be regarded as indigestible carbohydrates.

Ash—Also called mineral matter.

The most important functions of these constituents may be summarised as follows :—

FOOD CONSTITUENTS.

FUNCTIONS.

Albuminoids.	{	Form flesh, muscle or lean meat. Also produce the albuminoids of milk.
		Produce heat to keep up the temperature of the animal.
Oil and Carbohydrates.	{	Serve as a source of energy to enable the animal to perform work.
		Produce fat to be stored in the body of the animal.
Ash.	{	Assists in the formation of bone and other substances in the animal body which contain mineral matter.
Fibre.	{	Generally speaking, the fibre of food does not possess much direct value, but it has a considerable indirect influence upon the value of many foods.

Most foods, and especially most mixtures of foods constituting the daily rations of farm stock, contain a sufficient amount of ash to meet the requirements of the animal. Consequently, so far as the chemical composition is concerned, the relative values of different feeding stuffs depend upon the amount of albuminoids, oil and carbohydrates they contain.

In order to obtain the best financial return in feeding, it is essential that the correct amount of each food constituent be supplied to each animal in its daily ration. Generally speaking, the presence of an excessive amount of one constituent in a diet cannot be taken as a remedy for a deficiency in the amount of another constituent. Consequently, it is of the utmost importance for every farmer to have some idea of how the relative proportions of the food constituents should be varied according to the class of animal to be fed.

The following generalisations, considered in conjunction with the percentage composition of foods as given in the table on page 353, may provide some guidance for the selection of feeding stuffs best suited for different classes of animals.

1. Rations containing a high percentage of albuminoids are needed for—

- (a) young growing animals ;
- (b) fattening animals (especially during the first stage of fattening) ;
- (c) dairy cows (particularly for cows supplying a big yield of milk).

2. Rations of low albuminoid content are suitable for—

- (a) store animals ;
- (b) horses (especially when not performing very hard work) ;
- (c) adult animals in the last stage of fattening.

3. It is advisable to provide foods fairly rich in oil to—
 - (a) very young animals ;
 - (b) fattening animals.
4. Care should be taken to avoid excessive use of foods deficient in ash for young animals.
5. Rations with low fibre content should be provided to—
 - (a) very young animals ;
 - (b) fattening animals ;
 - (c) working horses.
6. Rations containing a high percentage of fibre may be supplied to ruminant animals, especially those in a store condition.

AVERAGE COMPOSITION OF FOODS.

Food.	Water.	Albu- minoid.	Oil.	Carbo- hydrate.	Fibre.	Ash.	*Food Units.
Earthnut Cake (decorticated) ..	11	47	8	24	5	5	161
Soya Bean Cake	12	43	6	28	5	6	150
Decorticated Cotton Cake ..	10	40	9	27	7	7	149
Undecorticated Cotton Cake ..	11	22	5	34	22	6	101
Linseed Cake	12	29	9	35	9	6	130
Linseed	12	21	37	20	7	3	165
Cocoonut Cake	12	20	9	38	16	5	110
Palm Kernel Cake	9	18	8	37	24	4	102
Beans	14½	26	1½	47	8	3	116
Peas	15	22	1½	53	6	2½	112
Gram Meal	10	20	5	52	10	3	114
Wheat Bran	14	14	3½	55	7½	6	98
Wheat	13	12	2	68	3	2	103
Oats	13	12	6	56	10	3	101
Barley	13½	10	2	67	5	2½	97
Maize	13	10	5½	68	2	1½	107
Wheat Straw	14	3	1	37	40	5	
Barley Straw	14	3½	1½	37	39	5	
Oat Straw	14	4	2	39	36	5	
Meadow Hay	15	9	2½	40	27	6½	
Clover Hay	16	12	2½	36	27	6½	
Bog Hay	9½	7½	2	50	28	3	
†Gorse	48	6	1¾	20	22	2½	
Pasture Grass	80	3	1¾	9	5	2½	
Turnips	92	1	½	5	1	½	
Swedes	89	1½	½	7	1½	1	
Mangels	87	1½	1½	9	1½	1½	
Sugar Beet	80	1½	—	16	1½	1	
Sugar Beet Pulp or Slices (dried) ..	10	7	1	62	17	3	
Do. do. (wet) ..	91	¾	1¼	5¾	1½	¾	
Potatoes	74	2	½	22	¼	1	
Locust Beans	14	6	2	70	6	2	
Treacle (from Beet)	21	9	—	60	—	10	

* See page 351.

† A special leaflet on " The Use of Gorse as Food for Farm Animals " may be obtained on application.

“ BALANCED ” RATIONS.

A ration is said to be suitably “ balanced ” when it contains the proper *relative* amounts of albuminoids, oil and carbohydrates to meet the requirements of the particular animal to which it is to be supplied, and, in addition, is neither too “ binding ” nor too “ laxative.” The use of rations which are not properly balanced involves much waste of food and money.

SELECTION OF THE MOST SUITABLE AND ECONOMICAL CONCENTRATED FOODS.

A general consideration of the systems of feeding in vogue in various districts within the College area shows that the type of rations commonly adopted might be very greatly improved and at the same time made much more profitable. Such improvement could often be effected with little or no additional expenditure and, in some cases, even with considerable curtailment of expenditure. It is often found that the food supplied to the animals cannot give a satisfactory monetary return on account of—

- (a) the excessive prices unnecessarily paid for the purchased concentrated foods ;
- (b) the lack of proper “ balance ” in the rations.

In many districts farmers have been accustomed to rely entirely upon wheat offals, maize and compound meals for their choice of purchased feeding stuffs. In other localities linseed cake and cotton cakes may be obtained in addition to those already mentioned. But in order that the most efficient and profitable methods of feeding may at all times be possible, supplies of earthnut cake, cocoanut cake, soya bean cake, palm kernel cake, gluten feed, gluten meal, maize germ meal, gram meal and any other type of feeding stuff on the market in other parts of the country should be obtainable in every district. The farmer should bear in mind that when there are only a few concentrated foods obtainable in his district he is unable to take full advantage of the fluctuations in the market prices of the various feeding stuffs. To illustrate the importance of this question we may consider the case of a farmer who needs a supply of a feeding stuff containing a high percentage of albuminoids. As regards composition and feeding properties earthnut cake and decorticated cotton cake are somewhat similar. Both contain over 40 per cent. of albuminoids. In other words these two feeding stuffs are interchangeable in making up rations. During the past few months the price of decorticated cotton cake has been particularly high and a considerable saving was effected by those who purchased earthnut cake as the latter was obtainable at a more reasonable price

Another thing that should be observed in this connection is the tendency of the home-grown foods to be comparatively deficient in albuminoids but fairly rich in carbohydrates. Consequently it is advisable for the farmer as a rule to purchase a certain amount of foods containing a high percentage of albuminoids in order to make up well-balanced rations. When the bulky portion of the ration consists mainly or altogether of good hay this may not be a matter of great importance. But when cereal straws, containing as they do a high percentage of carbohydrates and only a relatively low amount of albuminoids, are largely used it is particularly necessary to avoid using large quantities of concentrated foods with low albuminoid content. Foods rich in albuminoids should be purchased to make up for the deficiency of the straw in this particular constituent. In this connection it should be clearly understood that the use of a badly-balanced ration involves a waste of food. The excess of any food constituent (albuminoid, oil or carbohydrate) which a ration contains is wasted, because it cannot be properly utilised by the animal.

. If farmers generally were to appreciate the importance of providing animals with properly balanced rations they would not be satisfied with the particular concentrated foods which the merchants in many localities happen to keep in stock. When purchasing feeding stuffs the nature of the home-grown foods available and the type of stock to be fed should in the first place be considered. Then the market prices should be studied so as to insist upon the merchant supplying those particular foods whose prices at the time happen to be in favour of the buyer. By adopting this method of procedure rations might be better balanced, much less food would be wasted, and the feeding of animals would become much more profitable.

A particularly undesirable feature of feeding practices in Mid Wales is found to arise from a tendency on the part of farmers to form an exaggerated opinion of some one particular feeding stuff. For instance, one often meets farmers who endeavour to maintain that there is no feeding stuff to equal maize meal. They buy large quantities of that particular food but no other. Such a procedure, as a rule, means that much food is wasted because the rations are not properly balanced. What is true with regard to the excessive use of maize meal would, of course, apply equally well to the excessive use of earthen cake, cotton cake or any other feeding stuff. In general a mixture of two or more concentrated foods is much more economical than any one meal or cake by itself. By providing a mixture of foods it is often easier to supply properly balanced rations. Further, the palatability and digestibility of foods may be favourably influenced by adopting a suitable mixture in the diet.

The following classification of foods according to their characteristic effect upon stock and butter may be of some guidance in making up suitable rations.

" Laxative " Foods.	{	Linseed, linseed cake, soya bean cake, oatmeal, wheat bean, treacle, turnips, swedes, mangolds, young pasture grass.
" Binding " Foods.	{	Cotton cake (especially when undecorticated), maize meal, wheat flour, hay, straw.
Foods producing hard butter.	{	Beans, peas, cotton cakes, palm kernel cake, cocoanut cake.
Foods producing soft butter.	{	Linseed cake, bran, maize meal, oats.

Although the general tendency with farmers within the College area is to supply stock with a smaller quantity of concentrated food than is desirable one often finds that certain classes of animals are over-fed. Such over-feeding is found to be practised more particularly with fattening animals and dairy cows supplying but small quantities of milk.

Assuming that the rations contain a fair supply of swedes, and that the bulky fodder supplied consists of hay and cereal straw in approximately equal quantities, the following amounts of concentrated foods per day may be recommended :—

Fattening cattle (two-year old).—6 to 8 lbs. concentrated food.

Dairy cows.—For a cow supplying two gallons of milk per day 5 lbs. concentrated food, and 2 lbs. more concentrated food for every additional gallon of milk supplied.

It is seldom profitable to supply any concentrated food to a cow when its daily yield of milk is only a few pints.

COMPOUND MEALS AND CAKES.

In many districts compound feeding stuffs are purchased in considerable quantities. From time to time samples of several of these foods have been examined at the College laboratory. The results obtained clearly indicate that whereas many of them are satisfactory, both as regards nutritive value and market price, there are some which are inferior in composition and more especially much too expensive. One great disadvantage connected with the purchase of this class of concentrated food is that according to the Fertilisers and Feeding Stuffs Act the vendor is required to provide a guarantee of the composition only as regards the percentage of albuminoids and oil. The amount of carbohydrates present need not be stated. Of course, the same thing applies to the sale of such feeding stuffs as cotton cake, linseed cake, etc. ; but in the case of these foods it

is possible to ascertain, approximately, the amount of carbohydrate present by reference to a table of composition such as is provided in this leaflet. It is thus evident that on account of the uncertainty which often exists as to the amount of nutriment they contain, and the difficulty of ascertaining whether all the ingredients present are wholesome or otherwise, particular care should be exercised in purchasing this class of foods.

Abstracts.

A STUDY OF THE FECAL EXAMINATIONS OF 1,000 IMPORTED DOGS.

By MEYER WIGDOR, M.A.,

Junior Zoologist, Bureau of Animal Industry, Washington, D.C.

FOR a number of years, since January, 1911, the feces of imported dogs have been examined in this laboratory by various workers here, including Doctors Ransom, Hall, Graybill, and May, and by Messrs. Foster, Garlough, and Schwartz, and the writer. The findings have been summarised from time to time by Doctor Ransom in the Annual Reports of this Bureau, and were published in detail at an early date by Foster (1912).*

The fecal examinations were in compliance with Order No. 176 of the Bureau of Animal Industry, November 25, 1910, which requires that all collie or sheep dogs imported into this country be held in quarantine pending the results of a fecal examination. The object of the fecal examination is to prevent the importation into this country of such parasites as the gid tapeworm and the hydatid tapeworm, parasites injurious to live stock and to man. These dogs are held in quarantine until fecal examinations have been made, and the animals found free from dangerous parasites. Dogs are notorious carriers of parasites, and it is obviously undesirable to complicate the present problems of eradication and the application of prophylactic measures by importing fresh supplies. If a preliminary fecal examination shows the presence of *Tænia* eggs or proglottids, suitable anthelmintics are administered to remove the parasite before the animal is released from quarantine.

Data are now available on the fecal examinations of 1,000 imported dogs which have been examined from January, 1911, through July, 1919. The termination of the World's War gave a great impetus to

* Foster (1912). Analysis of the results of 87 fecal examinations of sheep dogs for evidences of parasitism. *Science*, n.s. (901), Vol. XXXV, pp. 553-554.

this importation of foreign dogs into this country, as the men who had seen service abroad in our army brought back considerable numbers, especially of the German sheep dog.

Among the breeds of dogs imported, the various breeds of sheep dogs were most numerous. They included the Belgian, English, German, French, Russian, and Dutch sheep dogs. Collies were next in number, and included the Scotch, Shetland, short-haired, and other breeds. German and Belgian police dogs were quite common, and there were also a limited number of wolf hounds.

In connection with these fecal examinations, the nature of the infestations with intestinal parasites is of interest. Of the 1,000 dogs examined, 540, or 54 per cent., were negative on fecal examination. Of the 460, or 46 per cent., that were infested, 258, or 26.8 per cent., were infested with ascarids, of which there were approximately three times as many *Toxascaris limbata* as there were *Belascaris marginata*; 86, or 8.6 per cent., were infested with hookworm (probably *Ancylostoma caninum* as a rule, but in some cases the species was probably *Uncinaria criniformis*); 15, or 1.5 per cent., were infested with whipworm (*Trichuris depressiuscula*); 36, or 3.6 per cent., were infested with *Dipylidium*; 152, or 15.2 per cent., were infested with *Tænia*; 1, or 0.1 per cent., were infested with flukes; 1, or 0.1 per cent., were infested with a larval nematode, probably *Hæmostrongylus vasorum*; and 1, or 0.1 per cent., were infested with a *Diphyllbothrium* sp. The dog infested with *Diphyllbothrium* was a Russian sheep dog and the worm on examination proved to be a different species than *Diphyllbothrium latum*.

Of the 152 dogs infested with tænioid cestodes, there were

68 infestations with *Tænia pisiformis*,

18 infestations with *Tænia hydatigena*,

15 infestations with *Multiceps serialis*,

1 infestation with *Multiceps multiceps*.

In 52 infestations with *Tænia*, the species was not determined.

Two dogs were infested with two species of worms, which accounts for the apparent total of 154 in this list.

The high percentage of dogs with negative fecal findings is perhaps associated with the fact that dogs valuable enough to import are usually well cared for and kept in cleanly surroundings. It is also true that a negative fecal examination is not entirely conclusive evidence of freedom from parasites. The absence of parasitic ova in the feces does not preclude the possibility of parasitic infestation, as many factors may account for the absence of the ova in the feces in spite of infestation. The low percentage of *Dipylidium*, hookworm,

and the especially low whipworm infestation is interesting in view of the fact that 30 to 50 per cent. of the dogs in most regions of the United States from which we have available data are infested with these worms. While a majority of the dogs imported into this country are free from intestinal parasites, so far as fecal examinations show, the occasional occurrence of such parasites as *Multiceps multiceps*, is evidence of the need for the quarantine and examination of imported dogs.—(*Journal of the American Veterinary Medical Association*.)

Parliamentary.

TUESDAY, JULY 13.

Conditions of Officers in R.A.V.C.

COLONEL SIR ARTHUR HOLBROOK asked the Secretary for War if any decision had yet been arrived at with regard to the conditions of half pay for officers in the Royal Army Veterinary Corps; what steps were being taken to reduce the surplus strength of major-generals in the Royal Army Veterinary Corps; and whether he was aware that there were two such officers surplus to establishment whose retention was retarding the promotion of junior officers; if the two major-generals surplus to the Royal Army Veterinary Corps establishment were paid as and reckoned on the list of colonels on the establishment of that corps; and, if so, why did they not receive similar treatment as regards the conditions of half pay as other colonels on the establishment?—Sir A. Williamson replied: The two major-generals referred to by the honourable and gallant Member were promoted substantive major-generals for distinguished service. They are not surplus to the establishment of the Royal Army Veterinary Corps, but are holding appointments as colonels, which they would have filled if they had not been promoted. Their retention is not, therefore, retarding the promotion of junior officers. I do not understand what conditions of staff pay for officers of the Royal Army Veterinary Corps the honourable and gallant Member refers to, but if he will let me have fuller details I shall be happy to look into the matter further.

Personal.

HIS MAJESTY THE KING OF ITALY has recently conferred the high honour of "Commendatore" of the Order of the Crown of Italy, also that of Cavalier of the Order of St. Maurice and St. Lazarus, upon

our distinguished Italian colleague, Professor Alfredo Bartolucci, Provincial Veterinary Surgeon (1st class) on the permanent staff of the Veterinary Public Health Service. The Service, which has its headquarters at Rome, and investigates and controls the measures adopted for the prevention and eradication of outbreaks of disease amongst animals. Professor Bartolucci, who will be recollected by some of those who served in Italy during the war, was the Secretary of the Commission who investigated the terrible epizootic of Foot and Mouth Disease in the cattle of Northern Italy in the spring of 1919. His friendship for his English colleagues was always well shown, and, like many other of our Allied confrères, he spared no trouble to give the British Veterinary Officer every help in his power to solve the numerous difficulties which naturally came in the path of those who were suddenly pitchforked into a strange country full of many diseases with which they had beforehand only a text-book acquaintance.

PUBLISHERS' NOTICE.

Owing to the recent further increase in the cost of printing and paper, we are reluctantly compelled to advance the price of the VETERINARY JOURNAL from 1s. 6d. to 2s. per copy. The Annual Subscription will be 21s., post free, instead of 18s., and the annual combined subscription with the VETERINARY NEWS will be 32s., post free. These revised rates to take effect as from July 1, 1920.

No increased charge will be made for subscriptions already paid to the end of the current year.

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THE VETERINARY JOURNAL

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GLADSTONE MAYALL, M.R.C.V.S.

OCTOBER, 1920.

Editorials.

COLONIAL SALARIES.

IN this issue we have devoted a number of pages to a Government report which is of the greatest interest to the whole of the members of our profession, whether recent graduates, or those who have attained an established position, and it is a pity that the Indian Veterinary Civil Service could not have been included in the same enquiry. For those who are on the threshold of a career they give the pecuniary prospect clearly defined from the start to the top of the ladder; and for the older men, who are in practice in England, they form food for reflection. To those who feel that they cannot adapt themselves to the routine of practice, or who prefer a Government career, these pages will afford much useful information. Some climates are more unhealthy and uncomfortable than others, and, as a rule, for them the rate of pay is higher and the terms of service before pension day comes along is shorter. The first essential of all must be the liking for a Colonial life, but our young graduates must not forget that the salary has to be commensurate with a white man's status; for out there certain rules of life are essentially to be followed, or one will be left to one's own society in comparative poverty.

Certainly some of the salaries and prospective increases do not appear enough as times are nowadays, and, comparing them with others of the Civil Services, the rate of increase is insufficient. One must not forget that before entering the Veterinary Service a man has to undergo a training, which has not only taken at least five of his best years without a salary, but has actually cost him in out-of-

pocket expenses approximately a thousand pounds. Not only is he handicapped by entering the lists comparatively late in life, his student days not counting towards pension, but he has actually expended a large sum of money in the effort of training, so that he is entitled to expect a salary at the commencement in proportion to the sacrifices he has made. Many expert veterinarians are urgently needed *at once* for our Colonial Services, and the best men will apply if the inducements offered are fair and satisfactory. The prosperity of our Colonies depends largely on the health of their agricultural stock, and to maintain that health the veterinarian is essential. The question of a reasonable and satisfactory pay depends entirely upon ourselves and our response or our boycott.

R.A.V.C. OFFICERS AND THE REMOUNT DEPARTMENT.

THE question recently asked in Parliament by Lieut.-Colonel Burgoyne (and quoted on a subsequent page) as to the appointment of a Veterinary officer to the Head of the Remount Department is one which concerns not only the members of the Royal Army Veterinary Corps, but to a very much larger extent, the British taxpayer; and the further question in which Col. Burgoyne asked the Secretary of State for War "What are the duties performed by Remount officers which could not efficiently and more economically be carried out by the Royal Army Veterinary Corps?" is of more interest to us still. As a matter of fact, a great deal of economy could be made by transferring the duties of the Remount Service to the Veterinary Service, and thousands of the British taxpayers' money could be saved every year. Take, for example, as one instance only, the duplication of officers in a Remount Depot. At the present time the Remount Depots have, of necessity, a Veterinary Officer attached in order to at once detect diseases (especially the contagious varieties) at their commencement. He is not supposed to treat them, when once segregated, for any length of time, but to evacuate them to a Veterinary Hospital (which is usually in the same neighbourhood); so that, except for prophylactic purposes, his duties are light. That officers of the R.A.V.C. are able to organise and command large camps was well illustrated during the late war, and that they also possessed tact and business acumen was shown by their management of the sales and disposal of the horses at the end of the war. *A Veterinary Officer is, by his training in the management of health and disease, the best fitted of all the services to command and manage a Remount Depot;* and there is absolutely no need for 113 extra officers, at an expense to the country of £75,000 a year, to purchase annually a matter of

only about 2,000 animals ! According to the Army Estimates, the cost of the Remount Service for 1920-21 is as follows :

Remounts Directorate	£4,156
Inspectors of Remounts	£3,080
Deputy Assistant Inspectors of Remounts	£14,360
District Remount Officers	£38,697
Personnel of Four Remount Depots, as laid down in the Peace Es- tablishment (cost of pay and rations only) and presumably shown in Army Estimates under R.A.S.C. vote	£12,200
Four Commanding Officers at £612 per annum each	£2,448

	£74,946

Seventy-four thousand, nine hundred and forty-six pounds per annum for the purchase of about 2,000 animals a year ! *It is not business, and is an unnecessary, wasteful expenditure, which is quite avoidable.* Let the horses when purchased be handed over to the care of the Veterinary Service, whose duty it is to keep the animals of the Army free from disease, and thus save the British taxpayer the major portion of the above £74,946. It is feasible and practicable, for the one service can be reduced or almost done without, but the other, wherever animals are to be kept in health, is a necessity. Under the present system there is a wasteful and totally unnecessary duplication both of officers and salaries.

ANIMAL LOSSES DURING THE GREAT WAR.

THE Veterinary Section of the Imperial War Museum at the Crystal Palace has compiled statistics of the animal casualties throughout the war. These show that the deaths were much lower than in any previous war, being less than 15 per cent. per annum.

484,143 animals lost their lives, this including 5,589 lost at sea. In the Dardanelles 13,864 died, and out of 120,013 camels employed, 28,812 lost their lives on service. In Mesopotamia alone in the last year of the war, 86.52 per cent. of the camels used there died. Only 1.06 per cent. lost their lives on the sea journey, and this in itself speaks volumes for the veterinary supervision both before and during transport.

In 1914 the average strength was 204,628 animals and of these 15.23 per cent. were on the sick list, the actual number of fatalities from all causes being 17,637.

In 1915 there were 483,134 animals on the average strength, the sickness percentage being reduced to 10.37 per cent. and in no subsequent year did it mount up beyond 11.44 per cent., although in 1917 and 1918 the average annual strengths were 966,840 and 827,506, respectively.

This speaks volumes for the veterinary organisation and the methods taken by the Royal Army Veterinary Corps, and shows clearly the enormous financial salvage which resulted to the nation as a consequence. In fact, it is impossible to contemplate the absolute collapse which must inevitably have occurred had not this care and trouble been taken under the directions of the skilled and properly qualified veterinary advisers.

ABSTRACT FROM THE REPORT OF THE COMMITTEE APPOINTED BY THE SECRETARY OF STATE FOR THE COLONIES TO CONSIDER THE STAFFING OF THE VETERINARY DEPARTMENTS IN THE COLONIES AND PROTECTORATES.

THE Committee appointed by the Secretary of State for the Colonies to consider the staffing of the Veterinary Departments in the Colonies and Protectorates consisted of :—

SIR HERBERT J. READ, K.C.M.G., C.B., Assistant Under-Secretary, Colonial Office (*Chairman*).

SIR JOHN M'FADYEAN, M.B., B.Sc., M.R.C.V.S., LL.D., Principal of the Royal Veterinary College, London.

SIR STEWART STOCKMAN, M.R.C.V.S., Chief Veterinary Adviser to the Ministry of Agriculture.

THE PRESIDENT OF THE ROYAL COLLEGE OF VETERINARY SURGEONS (Mr. J. McKinna, F.R.C.V.S.).

PROF. O. CHARNOCK BRADLEY, M.D., D.Sc., M.R.C.V.S., Principal of the Royal (Dick) Veterinary College, Edinburgh.

PROF. J. SHARE JONES, D.V.Sc., M.Sc., F.R.C.V.S., Director of Veterinary Education and Professor of Veterinary Anatomy in the University of Liverpool.

MAJOR R. D. FURSE, D.S.O., Assistant Private Secretary (Appointments), Colonial Office.

The terms of reference were :—

- (a) To consider whether the Staffs of the Veterinary Departments in the various Colonies and Protectorates are adequate, and, if necessary, to recommend increases of staff ;
- (b) To consider whether the rates of salary offered to the Veterinary Staffs are adequate, and, if necessary, to suggest improvements

- (c) To make recommendations for improving the arrangements for recruiting Veterinary Staffs for the Colonies and Protectorates.

RECOMMENDATIONS OF THE COMMITTEE FOR INCREASES OF STAFF AND RATES OF SALARY.

East Africa.

(i) *The East Africa Protectorate.*

1 Chief Veterinary Officer ..	£1,000.
1 Deputy Chief Vet. Officer ..	£800.
5 Senior Veterinary Officers ..	£600—£25—£700.
9 Veterinary Officers	£500—£25—£600.
1 Veterinary Pathologist ..	£900.
1st Assistant Vet. Pathologist ..	£700.
2nd " " " ..	£600—£25—£700.
3rd " " " ..	£500—£25—£600.
19 Inspectors	£250—£15—£400.
1 Laboratory Superintendent ..	£400—£20—£500.
2 European Lab. Assistants ..	£300—£15—£400.
2 " " " ..	£250—£15—£300.
2 Lay Field Assistants ..	£250—£15—£300.
1 Permit Officer	£300—£15—£400.

(ii) *Uganda.*

1 Chief Veterinary Officer ..	£900.
1 Deputy Chief Vet. Officer ..	£750.
3 Senior Veterinary Officers ..	£600—£25—£700.
5 Veterinary Officers	£500—£25—£600.
1 Veterinary Pathologist ..	£800.
1 Laboratory Superintendent ..	£400—£25—£500.
1 Laboratory Assistant ..	£300—£15—£400.
5 Inspectors	£250—£15—£400.

(iii) *Nyassaland.*

1 Chief Veterinary Officer ..	£750.
1 Veterinary Officer	£600—£25—£700.
1 " " " ..	£500—£25—£600.

West Africa.

(i) *The Gold Coast.*

1 Chief Veterinary Officer ..	£960+£96 duty allowance.
1 Veterinary Officer	£480—£30—£750+£96 duty allowance.
1 Assistant Veterinary Officer ..	£480—£30—£600+£96 duty allowance.

In the case of the Veterinary Officer the Committee recommend that a break in the incremental scale should occur at £600, further

increases being conditional on the attainment by the officer of a satisfactory degree of efficiency and otherwise dependent on the Governor's discretion.

(ii) *Sierra Leone.*

1 Veterinary Officer £500—£25—£600.

The Committee further recommend that a capable veterinary officer should be selected, with a salary of £750 a year, to visit both Sierra Leone and the Gambia and to report on the veterinary possibilities and requirements of both countries.

Cyprus.

1 Veterinary Officer £400—£25—£500.

The Committee agreed that the existing rate of salary paid to the Veterinary Officer in Cyprus, viz., £250—£10—£300 was inadequate. It has been represented to them that he is permitted to engage in the private practice of his profession, but they consider that, unless enquiry should elicit the fact that the value of such private practice is more considerable than they believe to be the case, salary should be paid to this officer at the rate now recommended.

Fiji.

The Committee recommend that the Veterinary Officer in Fiji should receive a salary of £750 a year. He has on his staff five Stock Inspectors and some Indian assistants, his emoluments being a salary of £500 a year, a house allowance at the rate of £50 a year, and a temporary war bonus. The Committee are of opinion that this rate of salary calls for improvement, and they recommend that it should be raised to the figure stated.

IN CERTAIN COLONIES NO REVISION NECESSARY.

In the case of certain Colonies, your Committee decided after consideration that the present veterinary staffs and rates of salary do not stand in need of revision. These Colonies were the following :—Zanzibar, the Straits Settlements, the Federated Malay States and Mauritius ; Trinidad, Bermuda and Barbados ; the Falkland Islands. The existing veterinary establishments and rates of salary are shown in the Appendix to this Report.

NIGERIA, TANGANYIKA AND THE WINDWARD ISLANDS.

On coming to the cases of Nigeria, the Tanganyika Territory and the Windward Islands, your Committee were informed that the situation in these countries with regard to veterinary matters was already the subject of correspondence between the Secretary of State and the local Governments. As regards the Tanganyika Territory, the Committee learn that the Secretary of State is awaiting proposals, which the Administrator is about to submit for the establishment of a permanent veterinary department ; in the meantime they do not feel

themselves to be in a position to make suggestions as to the veterinary staff which this former German Colony will require. They wish, however, to recommend that, in the grading of the personnel and the providing of appropriate salaries, the principle should be observed of securing as great a degree of uniformity as possible between the Tanganyika Territory and the Protectorates of Eastern Africa. In St. Lucia there has not hitherto been a Veterinary Officer paid entirely from Government funds ; but the Committee understand that the question of creating such an appointment is now under consideration. In the event of this question being decided in the affirmative, they would suggest that £400—£20—£500 a year would be a suitable scale of salary. They are aware that this rate of salary is lower than that recommended in the majority of cases, but they consider that, as a Veterinary Officer in St. Lucia would enjoy opportunities of adding to his official emoluments by private practice, his services would be adequately remunerated by the salary proposed.

CEYLON, BRITISH GUIANA, JAMAICA, LEEWARD ISLANDS: LITTLE
INFORMATION AVAILABLE.

In the cases of Ceylon, British Guiana, Jamaica and the Leeward Islands, your Committee are of the opinion that the information available concerning the present situation and future possibilities in respect of veterinary matters, is not sufficiently detailed to enable them to determine whether the existing veterinary staffs are adequate to carry on the work, nor whether they receive suitable salaries.

GROUNDWORK FOR RECOMMENDING INCREASES OF STAFF.

It will doubtless be remarked that your Committee have formed the opinion that in several cases, particularly that of the East Africa Protectorate, the existing veterinary staffs are inadequate to cope with the work demanded of them. Your Committee have, therefore, recommended a considerable increase in personnel as well as an appreciable improvement in the salaries to be offered. They put forward these recommendations with the less hesitation inasmuch as they feel confident that the additional expense which would be entailed by their adoption would be amply recompensed by their results. The Committee venture to say that, in their opinion, the importance of the stock industry to East Africa has not hitherto been fully recognised ; and they wish to associate themselves cordially with the views of Major-General Sir E. Northey, who regards cattle-rearing as the paramount industry of the Protectorate which he governs. If this be the case, no argument is needed to show that the prosperity of the Protectorate is largely bound up with the well-being of its animal population ; and it should evidently be among the proper functions of the Government to provide a Veterinary Department sufficiently

strong to ensure the competent care and supervision of the country's live-stock.

IMPORTANCE OF UGANDA.

The same considerations may be held to apply to the Tanganyika Territory and Uganda. Indeed, a particular feature of the position of Uganda is that very many of the diseases which are rife amongst the live-stock of East Africa originate in that Protectorate.

THE THIRD TERM OF REFERENCE.

We come now to the third term of reference which is "to make recommendations for improving the arrangements for recruiting Veterinary Staffs."

Your Committee beg to report that, in present circumstances, the only practicable measure which they can suggest is to offer the improved rates of salary recommended in the preceding sections. It should be remembered that the shortage of qualified veterinary surgeons, which was already pronounced before the war, has become accentuated by the interruption which the war has caused in the course of studies for the veterinary diploma. Until those students who have entered the veterinary colleges subsequently to their release from military duties begin to pass out from the colleges and universities on the completion of their studies, it is inevitable that the numbers of veterinary surgeons from whom the veterinary staffs of the Colonies and Protectorates can be recruited will continue to be very limited. Your Committee consider that so long as these abnormal conditions prevail, the means adopted to recruit veterinary personnel must necessarily take the form of "ad hoc" measures devised to meet special local requirements or to combat particular emergencies. Even so, they venture to hope that the adoption of the more generous scales of salary would not be without result in attracting a larger number of veterinary candidates to the Colonial Service.

SEPARATE VETERINARY DEPARTMENTS RECOMMENDED.

It has been the intention of your Committee in recommending increased veterinary staffs, to indicate the strength at which it should be the aim of local Governments to maintain their veterinary personnel in order to secure the due performance of the work which is necessary, both in the laboratory and in the field, if the stock industry is to progress and all the interests dependent on it are to flourish. The Committee found that in nearly all the Colonies and Protectorates which they have considered the Veterinary Departments are at present branches of the Agricultural Departments. They desire to recommend that in future veterinary and agricultural work shall be regarded as

distinct, and that the veterinary interests of the Colonies and Protectorates shall be entrusted to separate Veterinary Departments.

GROUND FOR RECOMMENDING INCREASES OF SALARY.

As regards the increased rates of salary recommended, it has been the aim of your Committee to propose such rates as may reasonably be offered to veterinary surgeons of real ability and scientific interests. The initial salaries suggested are considered to be suitable for a recently qualified veterinary surgeon taking his first step in a Colonial career. Your Committee trust that, with the increase of veterinary staffs and salaries and the enlargement of veterinary activities in the Colonies, the veterinary student may more fully realise the possibility offered him by the Colonial Service of making a career for himself. He should not forget that the opportunities of research which are met with in the tropical and sub-tropical Colonies are such as may well appeal to the ambitious student, inasmuch as, if utilised in due measure by carefully chosen veterinarians, they might well open the way to the advancement not only of the interests of the Colonies themselves, but also that of Veterinary science throughout the world.

IMPORTANCE OF CONTINUITY OF SERVICE IN VETERINARY DEPARTMENTS

More important, however, than the question of inducing veterinary officers to enter the Colonial Service is that of ensuring that they shall remain in the Service once entered, and go forward contentedly and whole-heartedly in the career which they have chosen. Your Committee hope that the new grading of veterinary appointments which they recommend, with the improved salaries which they propose should be attached to them, will prove effectual in securing that continuity of service among veterinary officers, the lack of which has retarded veterinary development in the past and would certainly be fraught with the same evil in the future.

INTERCHANGEABILITY OF STAFF RECOMMENDED.

With a view to offering brighter prospects of promotion and advancement to the members of the smaller veterinary departments, your Committee recommend that, where possible, the system should be introduced whereby the staffs of neighbouring Colonies and Protectorates would be interchangeable. This would secure to all officers of those departments the prospect of rising to higher and more responsible positions, wherein not only would the remuneration earned be greater but their work also would be more scientifically valuable.

APPOINTMENT OF A DIRECTOR OF VETERINARY RESEARCH AND ADMINISTRATION FOR EAST AFRICA, UGANDA AND TANGANYIKA CONSIDERED.

In addition, your Committee beg to report that they have considered a further question, which only remotely falls within the terms of the

subjects referred to them, namely, that of the appointment of a Director of Veterinary Research and Administration for the coterminous territories of East Africa and Uganda and Tanganyika. The Committee are not unanimous as to the practicability of combining in the hands of a single Director the responsibility both for administration and for research over so vast an area ; but they are agreed that results beneficial to all three territories would accrue from the institution of some form of supreme authority which should guide the direction of research into the most fruitful channels, and co-ordinate to their combined advantage the administrative work of neighbouring veterinary departments all engaged in the handling of common tasks and the solution of similar problems.

August 18, 1920.

ADDENDUM TO PARAGRAPH 12.

Indeed, the Committee would venture to express their belief that the benefits resulting from such research would not be confined to Veterinary science, but would also have a most important bearing on the subject of Human Medicine. They would recommend that every encouragement should be given to the interchange of ideas between research workers in human and animal disease, in order that the whole Science of Medicine might have the full advantage of the discoveries made in both fields of study.

WEST INDIES AND FALKLAND ISLANDS.

Colony.	Office.	Emoluments.	Whether pensionable.	Whether private practice allowed.	Notes.
(1)	(2)	(3)	(4)	(5)	(6)
Barbados	Inspector of Imported Animals.	£150	No	Yes	Also receives fees (£114-6-3 during 1917-18) as Veterinary Surgeon to the Police.
Bermuda	Government Veterinary Officer.	£150	Uncertain	Uncertain	—
British Guiana.	Veterinary Surgeon.	£300-20-400, with £75 travelling allowance.	No	Yes	Receives additional £50 per annum as Inspector of Hackney Carriages, Veterinary Surgeon for Fire Brigade and Municipal Veterinary Surgeon to discharge duties defined under the Milk By-laws in Georgetown.

Staffing of Veterinary Departments in the Colonies. 371

Colony.	Office..	Emoluments.	Whether pensionable.	Whether private practice allowed.	Notes.
(1)	(2)	(3)	(4)	(5)	(6)
Falkland Islands	Chief Inspector of Stock.	£350-20-450, with £50 horse allowance.	No	No	This appointment has recently been filled and the engagement is for a period of five years in the first instance. The duties amongst others comprise at least an annual visit to all farming stations in the Falkland Islands and the inspection of horses, cattle, sheep, &c., thereon, giving advice to the managers and farmers as regards their animals and live stock and treating the same where necessary..
Jamaica	Veterinary Surgeon	£450-25-550	Uncertain	See last column.	The office was previously known as Veterinary Consultant (with £150 per annum, fees and private practice), but the emoluments mentioned in column 3 have recently been sanctioned. It is contemplated that the holder should be a whole-time Government Officer, and be required to attend to all the Government stock, that the Government shall fix a scale of fees for services rendered other than to the Government, and that the Officer shall receive 25 per cent. of such fees, the balance being paid into General Revenue.
Leeward Islands, Antigua.	Inspector of Animals.	£115	No	Uncertain	Receives £75 as Inspector of Animals at the Public Market and also £40 as Veterinary Surgeon under the City Commissioners.
St. Kitts-Nevis	Government Veterinary Surgeon	£180	Uncertain	Yes	Salary includes travelling expenses in St. Kitts, but apparently not in Nevis, and covers all Government Veterinary work, inspection of imported animals, of Government stock, of meat, &c., without extra fees for Sunday or overtime work.

Colony.	Office.	Emoluments.	Whether pensionable.	Whether private practice allowed.	Notes.
(1)	(2)	(3)	(4)	(5)	(6)
Trinidad	Government Veterinary Surgeon and Examiner of Animals.	£300 and £50 transport expenses.	Yes	Uncertain	Holder also apparently receives £100 as Superintendent of Quarantine (Detention) Station for Animals. This post is vacant and the Governor reported in September, 1918, that the filling of the appointment was to be deferred until the details of the scheme for the reorganisation of the Department of Agriculture had been worked out.
Windward Islands, St. Vincent	Government Veterinary Surgeon.	£200 and £50 horse and travelling allowances.	Yes	Uncertain	This post has been permitted to lapse. The Estimates for 1920 mention that the holder resigned on June 15, 1918, and that the post has not been filled. The holder also drew £25 per annum as Rodent Examiner and Supervisor of Milk Supply.
St. Lucia	—	—	—	—	The question of the appointment of a Veterinary Officer has been raised and a further expression of the Governor's views is awaited. The emoluments suggested were salary of £300 per annum, with forage allowance of £45 per annum and the right to private practice, but it has been remarked that it is unlikely that it would be possible to secure a candidate from this country on these terms.

A Veterinary Surgeon (with salary at the rate of £382 per annum and transport expenses, but without private practice) was attached to the Imperial Department of Agriculture for the West Indies for a period of three years from June, 1911. The Commissioner did not recommend a renewal of the engagement on the ground that the general survey in view at the time of the appointment was virtually completed, and that the specific carrying out of remedial measures might best be entrusted to local veterinary officers resident in the several islands.

Clinical Cases.

REMARKS ON SEBORRHOEAL ECZEMA AND MALIGNANT VENEREAL DISEASE.*

BY DR. P. SACCO, O.B.E., CAVALIERE CORONA D'ITALIA.
(Chief Veterinarian to the Province of Cremona, Italy.)

IN a district like the Cremonese, where malignant venereal disease prevails, especially in the covering season, at which time both breeders and veterinarians have under their observation those animals which are used exclusively for breeding, and any which may show even the most remote symptoms of the unlucky trypanosomiasis, it is easy to fall into an erroneous diagnosis in the presence of lesions which resemble those of malignant venereal disease. This occurred in the Commune of C.D., in the quarter P——, of this Province.

A mare (Fig. 1), covered by a Belgian stallion belonging to a large stud, displayed a cutaneous lesion in the region of the ribs and the right haunch, which took the form of many sores from 2 to 5 cm. broad; and although unaccompanied by specific symptoms in the genital organs, or by constitutional disturbance, made the veterinary inspector diagnose malignant venereal disease. The veterinarian, from the absolute resemblance of the aforementioned



FIG. 1.

* Translated by Capt. H. L. Somers, late Royal Army Veterinary Corps.

sores to those occurring in malignant venereal disease, did not consider it necessary to extend his enquiries to the stallion, nor to the other animals in the stables of the stud, nor to those of owners in the vicinity. I was called in to certify to the reported case of malignant venereal disease, and at once noticed the great resemblance of the sores on the mare to those of malignant venereal disease. Desirous of getting to the bottom of the affair, I visited the stallion and found him quite healthy. In the stable adjacent to that of the mare whose case was reported I discovered that a form of cutaneous disorder had long existed, which attacked indiscriminately young or old horses, virgin mares and geldings. The proprietor told me that this skin disease manifested itself by the simultaneous appearance of a number of sores on some part of the body, preferably the trunk ; sores whose dimensions, number, and position remained unchanged for a long time, and all the longer in the absence of cleanliness and proper treatment.

In a four-year old virgin mare (Fig. 2) I found the malady in a more advanced state than in the case reported, the sores in this case were



FIG. 2.

quite separated from the cuticle, and were formed by the massing of the hairs agglutinated at their base by a wet, fatty secretion, not unlike pus.

With removal of the sores the denuded area was free from any cutaneous lesion, and when washed and treated with detergents, became nearly normal and only slightly congested. In an eight-year

old gelding (Fig. 3) I observed traces of the lesion in its final stage, that is to say, after the sores had fallen, leaving the parts bare, with a normal cuticle and the hair beginning to grow. Finally, in two foals of about one year old (one male and one female) I observed traces of the lesions completely cured, easily noticeable from the fact that the fresh hair was lighter, both in texture and in colour, than the rest of the coat and of unusual length, so that it seemed as though there were a patch where the sores had been. The owner informed me that this unwholesome condition had existed for fully 12 years in his stable,



FIG. 3.

and that it was easily cured by treatment with an ointment of Icthyol. He also told me that from many trials made by him he was never able to transmit the disease from one animal to another by allowing the matter which fell from the sores to fall on the skins of healthy animals.

From the observations made I was able unhesitatingly to exclude the existence of malignant venereal disease, and declare to the owner that the cases were "eczema seborrhoicum," a disease I encountered for the first time in 25 years of the exercise of my profession, and unknown to all the veterinarians of the district with whom I had occasion to discuss the circumstances. I consider my colleague's mistaken diagnosis as fully justified from the great resemblance of the sores to those of malignant venereal disease, and as the opportunities for observation and enquiry which I had were not open to him.

I consider it useful to publish these facts, together with the photographs of the lesions in their various stages for the guidance of my colleagues to whom analogous cases might occur. For the differential diagnosis between malignant venereal disease and seborrhoeal eczema it should always be borne in mind that the cutaneous sores produced by the trypanosoma equiperdum do not last long, leave no traces on the cuticle after they disappear, and are always preceded by specific lesions in the genital organs; also (very important for a correct diagnosis) are always of an œdematous character.—(From *La Clinica Veterinaria*, No. 12, 1920.)

DEMODECTIC SCABIES IN THE HORSE.

By BT. MAJOR G. WILLIAMSON, R.A.V.C.,
AND CAPT. G. E. OXSPRING, R.A.V.C.

THE *Demodex Equi* on the skin of horses produces a condition which, although well recognised in the Army, does not seem to be so familiar to the general practitioner.

In his "Studies on Acari," No. 1, The Genus *Demodex* (Owen), Hirst describes varieties of the parasite as it affects various animals, and gives a description and illustration of the *Demodex Equi* and the result of infection on the horse.

A report on the same subject by Croveri and Salvistrioni, drawing attention to the condition in Somaliland, is noted in the "Review of Applied Entomology," Vol. 7, Series B, Part 10, October, 1919.

During the year commencing July 1, 1919, the parasite was demonstrated on forty horses in the Aldershot Command.

Their presence was discovered during the routine examination of more than 220 horses and mules which had shown signs of pruritis, and, as no other parasite was found, the *Demodex* was credited with producing the lesions and symptoms described below.

Hirst (as quoted) states that the condition is often seen as an infection with other forms of mange. We have found one case in which the same animal was infected with *Demodex* and parasites of the family Sarcoptidæ. He further states that Col. W. Pallin, quoted by Major Wadley, found *Demodex* in 4.52 per cent. of a very large number of skin scrapings taken from Army horses.

It should be stated at once that in no case has the disease produced such marked symptoms as are commonly met with in the dog, but, nevertheless, the majority of cases show obvious lesions which one would be far from justified in neglecting.

There are two stages in the condition:—The first (the most benign and usually the most recently infected cases) is the stage in which there is no marked pustular formation.

The second is the more advanced stage, where the pustular formation is the most striking symptom.

In the first condition there is nearly always excessive pruritis. It is, however, worthy of note that few horses are so irritable that they will mutilate themselves, as they do when they are affected by the ordinary mange parasites ; it is for this reason that the attention of the layman is not immediately drawn to the condition.

When thoroughly examined, however, certain areas of the skin are found to be decidedly more irritable than others ; these are generally on the neck, withers and croup, the lower parts of the belly being rarely affected at this stage.

The lower third of the neck is the common site of origin.

On ocular examination little can be seen, though epidermal scales will be noticed to be more numerous than is usually found on a well-groomed horse.

If grooming has been neglected the accumulation of the scales is very noticeable, and is often considered to be the sole cause of the pruritis.

On manipulation of the skin it will be found that no thickening has taken place, and the presence of the minute pustules cannot always be detected.

Even at this stage of the disease from an ordinary scraping of the skin the parasite can be microscopically demonstrated.

Many cases, if untreated, will remain in this condition for weeks before the appearance of pustules.

The second, or pustular stage, may appear a considerable time after the original infection has taken place, or may be the first stage that is noticed, not always, it is thought, through carelessness of observation, but because, in certain horses, pustules appear very soon after the primary infection.

The cutaneous irritability at this stage is very much less marked, but a certain thickening of the skin will always be noticed ; the condition, moreover, assumes a more localised character, although there is a tendency to spread downwards over the trunk.

The base of the neck and withers is again the most common site affected, and from here the pustular area spreads downwards over the breast and backwards on to the lower scapular region.

The skin round the base of the tail is also commonly affected, but the lesions from this site seldom seem to spread.

It has been the exception, more than the rule, to find the lips and the nostrils affected, although it has been often noticed on the skin round the base of the ears and over the forehead, the tendency here being to spread down the cheek.

In this stage the skin is always thickened, but the thickening is not of a superficial nature ; in fact, the actual superficial layers appear to be very little changed.

The pustules have no tendency to coalesce, but can usually be felt as distinct excrescences.

A droplet of sebaceous looking pus can be expressed from them at the earliest stage of formation, but later on the exudate forms into a hard, tenacious crust.

At no time has the discharge been so great as to cause the moist condition of the skin seen in the advanced stage in dogs.

Unlike the other forms of mange, there appears to be a greater tendency for the disease to occur during the summer months than in the winter.

Clean, well-groomed horses seem to be as often affected as ones less well-cared for.

Practically all the cases have been horses in exceptionally good condition.

The progress of the disease is always slow.

We were unable to find or obtain any evidence of the disease being of a contagious nature, inasmuch as practically all the cases were isolated ones from different units and areas, and there never appeared to be any marked tendency to spread within a unit.

In the microscopical examination of the scrapings the usual procedure of boiling in 10 per cent. caustic potash solution, centrifuging, and examining the deposit was adopted.

The *Demodex* is very much smaller than the *Sarcoptes* Equi, being only 250 to 300 μ m. in length, and is consequently very easily missed if the slide is examined with a 2-3 objective, the one usually used when examining for ordinary mange parasites.

Various treatments have been used ; for those subjects in which there has been no pustular formation cure has been produced after one or two applications of any ordinary skin dressing, those of sulphur having a non-irritant oil as a base have given the quickest and best results.

On the other hand, when the disease has got to the pustular stage great difficulty is experienced in curing it.

Though the areas affected always appear localised, if treated locally it will be found that fresh areas of infection appear.

It is therefore advised that, whatever dressing is used, it should be applied generally, and the thoroughness of the application is as important in treating this condition as it is in the more common forms of mange.

Relapses after an apparent cure have not been uncommon, and

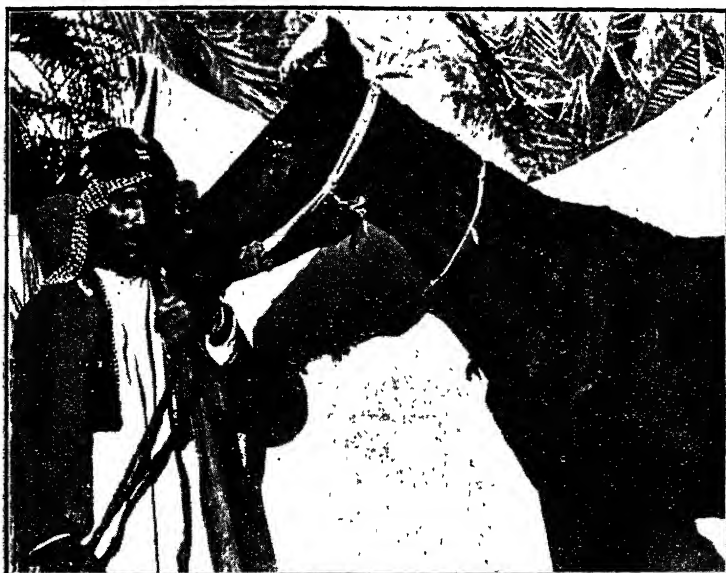
all sign of the disease should have disappeared for a week or two before one could consider the animal as being cured.

A TYPICAL REACTION TO MALLEIN.

By J. R. HEWER, M.R.C.V.S.

(Late Captain, Royal Army Veterinary Corps, Swindon.)

THE photograph herewith, which was taken in Mesopotamia, at the twenty-fourth hour after test, is interesting, as it shows clearly a typical reaction to both eye and neck tests, which were done at the same time with ordinary Mallein, 1 c.c. being used, two drops being injected into lower eyelid and remainder into neck.



TYPICAL EYE AND NECK REACTIONS TO MALLEIN.

The subject was an Arab "Gharry" pony, and was tested with all the other ponies at Busrah on account of a serious outbreak of glanders occurring among them.

Needless to say, the animal was destroyed.

INFLAMMATION OF THE FASCIA OF THE THIGH.

By CAPT. J. R. HODGKINS, D.S.O., F.R.C.V.S.

(Royal Army Veterinary Corps, Secunderabad, India.)

THE subject of this inflammation of the fascia of the thigh was a nine-year-old polo pony. He was bought by his present owner in the beginning of 1920. The pony at the time was being played in a

tournament, and suddenly went lame, in consequence of which he was unable to travel to his new home for two weeks.

On arrival he was still lame on the near hind. Examination showed a swelling on the inner surface of the thigh. The swelling was painful to the touch, and about the size of the palm of a man's hand.

Treatment was simple. Fomentations, hand rubbings, and light exercise relieved the lameness in about three weeks. But the swelling remained. Its character, however, was changed. At the end of three weeks it was hard to the touch, almost bony in consistence. There was no longer swelling immediately under the skin. The condition existing was now obvious—an ossification of the fascia, the result to its previous inflammation.

The case was interesting and satisfactory, for the pony got into work and did very well. Four months later he was sent again with an identical swelling of the off thigh, and in addition an inflammation of the fascia of the outer surface of the thigh.

Treatment was on the same lines, a mild liniment being used to facilitate the massage. The swelling of the inner surface of the thigh of the off leg went through exactly the same phases as that of the near. The pony has now two "plaques" of ossification, one on each thigh. He is perfectly free from lameness.

It remains to say that the inflammatory condition of the fascia on the outer side of the off thigh subsided without leaving any thickening such as is to be found on the inner surface.

A TREATMENT OF THE DIFFERENT FORMS OF MANGE AND OTHER PARASITIC SKIN DISEASES OF HORSES AND MULES WITH A COMBINATION OF CALCIUM SULPHIDE AND HORSE FAT.

BY CAPT. R. P. HOLMES, M.R.C.V.S., D.V.S.M., N.D.A.,
Royal Army Veterinary Corps, Aldershot.

IN the treatment of mange there are many formulæ used, each of which has met with a certain degree of success. I write these few lines with the object of placing before members of the profession some of my experiences in the methods employed in the treatment of mange and other parasitic skin diseases of horses and mules.

Before the animals are dressed in any way, it is important that an accurate diagnosis should be made as to the nature of the skin disease from which they are suffering. This is done by taking scrapings from suitable areas of the skin where the lesions are most prominent. Having selected the areas, the hair over the parts should be closely cut with scissors, then each area carefully soaked with a 7 per cent. solution of liquor potassæ, and scraped with a sharp scalpel down to

the true skin until bleeding is produced. The whole of the loose hairs, scabs, blood, and scrapings are collected in a large strong test tube, and more liquor potassæ of the above strength added. This is boiled for from seven to ten minutes, and then centrifuged for five minutes, and the resulting sediment spread out thinly on glass slides and examined under a 1-in. objective for parasites or their eggs.

PREPARATION OF THE CALCIUM SULPHIDE.

In the treatment which is the subject of this article calcium sulphide forms the basis of the dressing, and the following is an account of the method employed in preparing it on a small scale :—Two and a quarter pounds of sulphur and one pound of quicklime were mixed together dry in a large bucket, and hot water was gradually added, being constantly stirred until the lime was slaked and the lime and sulphur were reduced to an even paste. The contents were then made up to two gallons with more water, and the bucket placed over a hot stove or fire. This was then boiled for about three hours until it thoroughly combined and formed a dark reddish-brown solution. The solution should be constantly stirred during the process of boiling, and when this is completed it should be made up to the original two gallons with water. For preparation on a larger scale a Sawyer's stove, or an ordinary copper is very convenient, but the solution, when prepared, should be immediately removed on account of its corroding effect on the boiler.

TREATMENT OF SARCOPTIC MANGE.

In the treatment of sarcoptic mange, as in the treatment of all other forms of parasitic skin disease, the affected animals should be closely clipped all over, manes hogged, and tails trimmed short, and all the hair carefully collected and burnt. The animals are then thoroughly washed with warm water and soft soap to remove all scabs, scales and loose hair, scraped down, and then lunged to stimulate the action of the skin, when the calcium sulphide and horse fat dressing should be applied in the following proportions at a temperature of 100° F. :—

- 1 gallon of calcium sulphide solution.
- 2 gallons of water.
- 2 gallons of horse fat.

When the dressing has been made up in the above proportions, it is important that the ingredients should be thoroughly mixed together by constant stirring, and kept at 100° F. by heating over a stove whilst the dressing of the animals is in progress. A paraffin stove with a double burner is the most convenient apparatus for warming the dressing, as the flames of it can be regulated so as to keep the

mixture at the desired temperature. It will be found that $1\frac{1}{2}$ pints of the above mixture is sufficient to give one animal a good dressing all over. When the dressing has been applied it should be allowed to remain on the skin for nine days and rubbed well in with the hands daily after lunging. A little fresh dressing may be added on the third and sixth days following the first application. On the tenth day the animal should be thoroughly washed with warm water in order to remove the whole of the sulphide dressing; then scraped, and exercised until dry, when it should be well groomed and the mange dressing reapplied in the same proportions, and the above treatment continued for another nine days. Whilst this is being done the stalls, mangers, walls, floor, and bales, etc., should be thoroughly disinfected with a powerful blowlamp flames, and creosol solution should be freely used on the floors. No bedding should be allowed during the period the animals are under treatment.

Treatment for one month, or three separate courses of dressing, will almost invariably result in a radical cure, but it is absolutely necessary for success that everything should be carried out in a most thorough and systematic manner. After the third dressing the animals should be placed under observation for at least 14 days. With exceptional cases it may be necessary to repeat the treatment, but this is generally only necessary when either the first course of treatment has not been thoroughly carried out or the animal has become reinfected.

TREATMENT OF PSOROPTIC AND SYMBIOTIC MANGE.

The treatment of psoroptic mange should be carried out on similar lines to that described for sarcoptic mange, but usually two courses of dressing covering a period of three weeks is sufficient, though it is advisable to thoroughly examine the animal's skin after the mange dressing has been washed off for any definite lesions, and if these are present the affected areas should be scraped, and the scrapings treated and examined microscopically for parasites or their eggs, and if any be found a third course of dressing should be continued immediately.

In the treatment of symbiotic mange, which is chiefly confined to the legs, one course of dressing is usually sufficient, and this should be allowed to remain for 12 days, a little fresh dressing being added on the fourth and eighth days after the first application. The exercise should be carried out on a clean track, special care being taken to keep the legs perfectly clean whilst under treatment. The dressing should be well rubbed in daily, using an old dandy brush for the purpose, which should occasionally be rinsed in a bucket of hot water; this has the effect of melting the horse fat and greatly assists in distributing the dressing over the affected parts. In badly affected animals I always

consider it advisable to dress the whole of the body in addition to the legs on the first application, as in these cases I have often found symbiotic parasites and their eggs in scrapings taken from different parts of the body, especially from the shoulders and hind quarters, when only the legs were apparently affected.

Disinfection should be thoroughly carried out with a blowlamp, and all bedding should be burnt, and no more allowed until the animals are completely cured, as this is the chief source of infection, especially in symbiotic mange. In the case of sarcoptic and psoroptic mange strict attention should be paid to the thorough disinfection of horse rugs, blankets, saddles, and grooming kit, etc. The leather work of harness and head stalls, etc., should be treated with paraffin emulsion consisting of one pint of paraffin oil, one pound of soft soap in one gallon of water.

TREATMENT OF DEMODECTIC MANGE.

During the last three years I have met with several cases of pruritis in horses and mules caused by the parasite *Demodex folliculorum*, as revealed by microscopical examinations of scrapings taken from different parts of the body where the pruritis was most evident. The lesions which appear in the form of small petechial eruptions are usually confined to certain areas, generally around the mouth, on the sides of the face, and along the withers and back. As a rule there is very little pruritis, and the animals seldom rub themselves but respond to scratching. It appears to attack isolated cases and is not very infectious, as animals working in direct contact with infected cases for long periods often remain unaffected. I have never noticed any definite pustules in horses or mules like that which is so commonly associated with this form of mange in the dog, though the parasites appear to burrow down into the sebaceous glands of the skin, and in this respect render treatment very difficult, as washings with creosol solution, cattle dip, or Mykrol in suitable dilutions only have the effect of destroying the surface parasites. The best form of treatment is to clip the animal all over and wash with soap and water, then apply a dressing of calcium sulphide and horse fat in the same proportions as that employed in the treatment of sarcoptic mange. Two courses of dressing extending over a period of three weeks will generally effect a cure.

TREATMENT OF FORAGE ACARI INFECTIONS.

The preliminary step to be taken in the treatment of pruritis due to forage acari is to clip the animals all over, singe, then wash with soap and warm water, and exercise until dry, afterwards applying a dressing of calcium sulphide and horse fat in the following proportions, warmed to a temperature of 100° F. :—

1 gallon of calcium sulphide solution.

3 gallons of water.

2 gallons of horse fat.

The dressing should be well rubbed in daily with a dandy brush after exercise, or the animal may be lunged for ten to fifteen minutes, which has the effect of stimulating the action of the skin by sweating and at the same time warms the dressing, rendering it easier to distribute over the affected parts. The dressing should be allowed to remain for a fortnight, and a little fresh dressing may be added on the fourth and eighth days following the first application, but this is only necessary with badly infected cases. One pint of the above dressing is sufficient to dress one animal all over, and one course of dressing extending over a period of 14 days almost invariably results in a cure.

TREATMENT FOR LICE.

Various dressings have been recommended for the treatment of lice, such as suitable dilutions of creosol, creolin, lysol, cattle dip, and Mykrol; also decoctions of Stavesacre and tobacco, all of which have been proved by their use to be most effective in the destruction of lice, but the eggs, or "nits," have great powers of resistance, and remain unaffected by most dressings, hence the prolonged period of treatment often required in badly affected cases in spite of the most careful vigilance and rigorous methods of treatment. With particular reference to these badly infected animals, which have so often proved very obstinate cases to treat, in order to effect a cure in a short time, I have used with considerable success a dressing of calcium sulphide and horse fat in the same proportions as that used in the treatment of forage acari. This dressing has a marked effect on the eggs, or "nits," and appears to destroy them by a process of suffocation, as lice are very rarely seen after the dressing has been applied. The affected animals are clipped all over, singed, and washed with soap and water, scraped down, and exercised until dry, when the dressing should be immediately applied warmed to a temperature of 100° F. One dressing is generally effective, and almost invariably results in a cure in from six to eight days. The dressing should be applied with an old dandy brush about half worn, being rubbed well in daily with exercise, and should be allowed to remain until the lice and eggs have disappeared, when the dressing should be washed off with soft soap and warm water. In exceptionally bad cases it is sometimes necessary to add a little fresh dressing about the fourth day following the first application. It will generally be found that when the dressing has been rubbed in well for two or three days that the eggs loosen their hold and are easily removed by grooming. From records taken of my personal supervision and treatment of over 200 cases by the above method, all

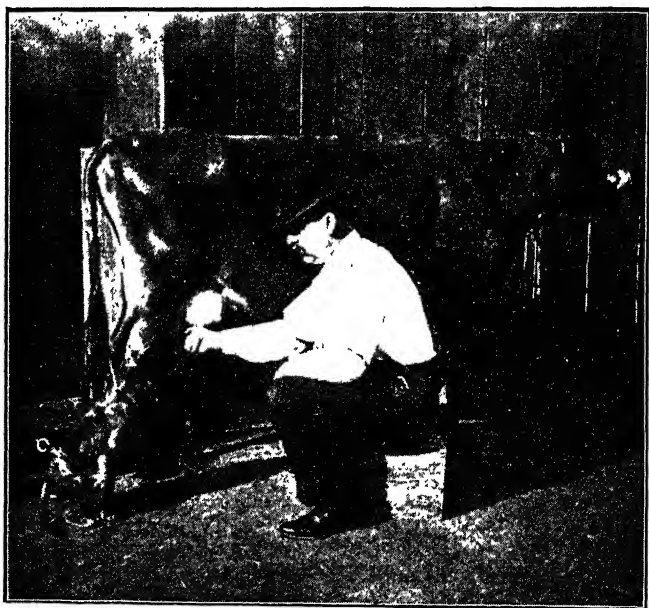
of which were very badly affected with lice, the average time under treatment was eight days. Whilst some of the milder cases were cured in four days, a few exceptionally bad cases were under treatment for a period ranging from fourteen to seventeen days.

When using a dandy brush for rubbing in the sulphide dressing, it is good practice to keep the brush warm by frequently rinsing it in a bucket of hot water. This has the desired effect of melting the horse fat which clings to the hairs and greatly facilitates the distribution of the dressing.

An important point in favour of the use of a combination of calcium sulphide and horse fat as a dressing, in addition to its remarkable qualities as a parasiticide, is that it also produces a beneficial effect on the skin by keeping it soft and supple, and where patches of hair have been removed by constant irritation and rubbing in the earlier stages of the disease, it tends to promote the growth of new hair.

DIRECT FROM PRODUCER TO CONSUMER.

THE photograph here reproduced was sent to us by Dr. Frank Attwood, V.S., New Haven, Connecticut, U.S.A., and demonstrates clearly that the consumer in this instance, at all events, has no thought



of Milk and Dairies Bill, Pasteurisation, sterilization, or anything else beyond an ardent wish to get it uncontaminated by unclean vessels, and, in fact, just merely "direct from producer to consumer."

IRRITATION BY TICKS ON THE EARS OF THE DOG.

By FREDERICK HOBDAY, F.R.C.V.S..

London.

ON several occasions lately we have had dogs brought to hospital with the history of a persistent shaking of the head and ears, the former being held on one side. Usually, too, with the history that the owner had had the dog away for a holiday in the country where there was a common on which it had habitually been taken to exercise.

On examination of the under surface of the ear flap we have found specimens of one or more ticks firmly attached, and a specimen which I sent to Mr. Noel Pilliers, F.R.C.V.S., for examination was named as the *Ixodes Hexagonus*.

AN INTERESTING CRYPTORCHID OPERATION.

By GEORGE HOWIE, M.R.C.V.S.,

Alford, Aberdeenshire.

Subject.—A two-year old Clydesdale colt, from which the left testicle had been removed a year previously. The animal was vicious, and could not be kept in a field when other horses or mares were near. Having been cast, chloroformed, and secured in the manner adopted for rigs, the skin of scrotal region was painted with iodine tincture and the incision made carefully in the usual manner. The subcutaneous tissues were separated, and the external abdominal ring explored without finding either testicle or cord. The abdominal cavity was then penetrated, and after some search the cord was encountered. On following this up the huge testicle was found rolling about amongst the viscera in the neighbourhood of the right kidney. It was quite free, not adherent to the peritoneum at any point, and globular in shape, being about the size of a child's head. To the feel of the fingers it was like a large cyst, having its walls composed entirely of bone or cartilage, and at no point could the wall be penetrated by scraping with the finger nail. An attempt to puncture it with a trocas was ineffectual owing to the difficulty in keeping the testicle against the abdominal opening and to the density of the exterior. Three ways out of the difficulty suggested themselves: (1) To stitch up the scrotal wound and leave the animal a "rig"; (2) to enlarge the opening so that the organ could be removed, risking descent of the viscera; (3) to sever the cord and leave the testicle in the abdominal cavity. The latter alternative was adopted, and a loop of the cord, which, fortunately, was of considerable length, was pulled up through the canal, a blunt hook being fixed in the flexure of the cord, the ecraseur chain slipped over this and on to the doubled cord. A length of some three inches was in this way removed. No further

examination of the testicle was made, and the wound was packed with gauze, the scrotal skin being closely sutured.

Recovery was uneventful. The horse is now three years old, and in daily work, being quite docile and showing no sexual propensities.

The case recorded by Professor Hobday on page 12 in the January, 1920, number of the VETERINARY JOURNAL reminds me of a similar one which occurred in my own practice a short time ago.

PROLAPSE OF THE VAGINA. OPERATION. AN UNTOWARD SEQUELA.

By H. R. SEDDON, B.V.Sc.,

Veterinary School, Melbourne University.

A YOUNG Pointer Bitch was admitted to the hospital on August 11, with a prolapse of the vagina. The organ was congested and cedematous, and, where it had come in contact with the ground, was ulcerated.

The *History* was meagre. Five days previously the owner had left the bitch, supposed to be a maiden and showing some signs of heat for the first time, shut up, and when he returned some hours later she was running about the yard and the prolapse was evident. The owner was positive that the bitch had not been lined during his absence, as there were no other dogs on the place, and the gate of the yard was locked. Notwithstanding this assurance on the part of the owner the condition warranted the belief that the bitch had been served by a dog and injured to some extent.

Treatment was commenced at once. The bitch was given morphine sulph., grs. 3 hypodermically, and the prolapse reduced; a plug of gauze was inserted, two silver wire sutures put in the vulva and a bandage applied. The bandage was removed daily and the vagina syringed out with solution of Tannic Acid, but this treatment did not meet with permanent success, so that nine days after admission it was decided to operate on the prolapsed organ.

Operation on August 20. The animal was given morphine grs. 3, anæsthesia was completed with ether, and the parts cleansed. A circular incision was made through the wall of the vagina immediately anterior to the meatus urinarius, the vagina drawn down as far as possible, the uterus ligated and the vagina and portion of the uterus amputated. The stump was pushed back, the cavity swabbed out, and the anterior end of the remaining portion of the vagina closed with a purse-string suture.

The end of the vagina healed rapidly, and the bitch did well for about a fortnight, when she suddenly went off her appetite.

Other symptoms then developed, suggestive of distemper. Diarrhoea appeared, and there was some discharge from the nose. Medicinal treatment was tried and met with some success, but in spite of all efforts the animal became very emaciated and three months after the operation was destroyed.

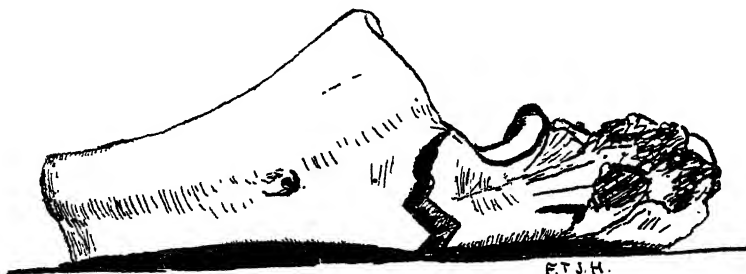
Post-mortem examination showed extreme emaciation; the vaginal wall had completely healed; there was no sign of septic infection in the pelvis, and the stump of the uterus had healed. The horns and body of the uterus were greatly distended, tense, and contained a muco-purulent material, the body of the uterus being about $2\frac{1}{2}$ inches in diameter and the horns about $1\frac{1}{4}$ inches in diameter.

It was thus apparent, therefore, that the case had developed into a pyometra, and the closing of the uterine exit and damming back of the infection had resulted in a general cachexia. It is interesting to speculate as to the origin of the infection. Was it primary to the prolapse, or was it secondary? All that can be said is that the history of good health up to the appearance of the prolapse was definite and that physical examination at the time of operation did not discover any enlargement of the uterus or vaginal discharge more than was compatible with the local condition.

A FRACTURED OLECRANON.

By W. D. WALLIS, M.R.C.V.S.,
Barnet.

ALTHOUGH one would think that, on account of its exposed and prominent position, fracture of the olecranon would be met with frequently, it is not often that a case is reported or commented upon in the Veterinary press, and for that reason I thought the enclosed to be interesting.



TRANSVERSE FRACTURE OF THE OLECRANON.

The patient was a nine-year-old cart mare, which was being utilised in the shafts of a heavily loaded hay cart. Something frightened her and caused her to turn round suddenly, the result being that the cart overturned and she was pulled down with it. Upon being released

she held up the near fore leg, but when made to progress there was very little lameness.

Crepitus, however, together with pain and swelling of the part revealed a fracture of the olecranon, and she was destroyed.

Upon cleaning out the specimen the fracture was found running transversely across it as shown in the sketch.

FISSURE OF THE MOLAR TEETH.

By WM. PAUER, M.R.C.V.S.,]

Blackwater.

Subject.—Chestnut mare pony, four years old, in good condition ; affected with a slightly offensive nasal discharge from the right nostril ; was sent to me for treatment in October, 1913.

History.—Had been sent over to owner from Ireland a few months previously, he being of the opinion that she had been injured on the journey. He said that there was a distinct enlargement of the facial bones below the right eye—this had now disappeared, but the nasal discharge was getting gradually worse. Usual remedies, such as fomenting and steaming the head, had been tried with no good result.

Diagnosis.—Catarrh of the mucous membrane of the frontal and maxillary sinus.

Treatment.—The frontal and maxillary sinus were trephined and irrigated with a creolin solution twice daily ; a little pus occasionally came away from the lower opening. After a week's treatment there was no improvement, and I then opened the lower maxillary sinus, and, much to my surprise, found it filled with decomposed food. On examining the mouth, transverse fissure of the fourth upper molar was detected, and it was evident that purulent periostitis had taken place. The fourth upper molar on the opposite jaw was similarly fissured. With a little difficulty, the decomposed food was removed from the sinus, but after each feed freshly masticated food had collected again.

My opinion was that a cure was not likely to be effected, even if the molar was removed, and the owner decided to give up further treatment and get rid of the pony, since when I have heard no more of it.

Remarks.—The pony fed well and showed no symptoms of tooth trouble. The split in the two molars was identical, and would almost admit my little finger. Under ordinary circumstances, examination of the mouth would have been made at once, but the owner put me off my guard by being convinced that the pony had been injured on the journey—and this seemed feasible.

OPEN SHOULDER JOINT (HORSE).

By CAPT. J. R. HODGKINS, D.S.O., F.R.C.V.S.
(*Royal Army Veterinary Corps, Secunderabad, India.*)

THE shoulder joint of the horse is so very well protected that it is seldom that the capsule which encloses it is ruptured. In 1912 I described a case in, I think, the *Veterinary Record*. I had not seen one before this nor since until the present case. The previous case was a puncture which I saw very early, and which made a perfect recovery. This one, unfortunately, was not so simple, nor its termination as happy.

A bay Australian trooper (mare) of very quiet disposition, but frequently in trouble, received a very severe kick just above the point of the shoulder.

From the first the injury was very painful, the swelling extensive and intense, the whole limb was "dropped," with the toe withdrawn so that the face of the hoof was almost on the ground. There was no leakage from the joint until the third day, when synovia was present in large quantities. This was controlled comparatively easy with a bin iodide blister, but a bloodstained liquid continued to drip. The animal was still excessively lame, and atrophy of the scapular muscles was very marked. It appeared more than probable that an arthritis was present, and that no useful purpose would be served by further treatment. The animal was destroyed.

Post-mortem Examination.—On removal of the skin, bruising was apparent over a large area. There was a hole between the external inferior attachment of the supraspinatus and the biceps muscles leading into the joint. A fragment of bone was found detached from the head of the humerus. The joint cavity contained a dirty yellowish fluid. The synovial fringes were thickened and gelatinously infiltrated. Proliferation of the cartilage at the edge of the articular head of the humerus had commenced. A considerable area of cartilage was eroded from the head of the humerus, whilst that in the articular cavity of the scapula was intact. This was probably owing to the fact that they were no longer in contact since the rupture of the capsule.

A SEVERE OUTBREAK OF MYCOTIC APHTHA IN SHEEP.

By J. F. D. TUTT, M.R.C.V.S., F.R.M.S., F.Z.S.,
Winchester.

BEYOND an abstract from Circular No. 54, Bureau of Animal Industry, U.S.A., August 10, 1914, very few records appear to have been published on this condition, and as it is probably rather uncommon, at any rate in this country, the following account of a recent severe outbreak that came under my notice may prove of interest.

The sheep (500 ewes and lambs) were on vetches, on recently

claimed land, and thistles affected with blight in large numbers; in fact, there were more thistles in some parts than vetches. After a comparatively long spell of dry weather, the deluge that has marked the July of this year started, and within a few days the first symptoms were noticed in a few of the ewes, this rapidly spreading until over three hundred of the flock were affected.

Symptoms.—There were certain differences between the lesions as encountered in the ewes as compared with the lambs.

In the Ewes.—The first noticeable feature was marked swelling of the lips and nostril, followed by a slight cough, and a pus-like discharge from the nostril. Several “pimples” formed on the lips, enlarged, and ulcerated, exposing red surfaces. A few were present inside the lips, but none were found on the dental pad or tongue. A glairy very offensive salivary discharge was also present. Feeding was not seriously interfered with, and loss of condition practically negligible. The lip lesions healed on an average from seven to fourteen days, and the swelling of the lips and nostril gradually diminished as the “pimples” ulcerated. No foot lesions were met with in the ewes.

In the Lambs.—Mouth lesions were encountered in some cases, as in the ewes, but by far the commonest seat was the limb below the fetlock, and in every case, with only one exception, it was the front limbs. In this case the lesion was more of a vesicle than a pustule or pimple, and was found round the coronet, between the digits, and at the junction of the hoof with the limb. In many cases only one limb was affected. Lameness was practically absent, and there was no shaking of the feet. About fifty lambs in all were affected, and the one death that occurred during the course of the disease occurred amongst them, and in this case there was only one lesion on the foot.

Treatment.—The affected animals were immediately isolated from those not affected. When first seen only about half-a-dozen ewes were affected, but within a week over 300 were affected, and as there was a paucity of pasture it was found impossible to move them off the pasture they were already on, as the only other ground available was grass land, and it was found that, when put there, those affected with mouth lesions were unable to feed, while on the vetches they were able although, of course, with a certain amount of difficulty, to do so. Trough feeding was discarded for a similar reason, so it will be seen that the second and apparently obvious line of treatment, *i.e.* to remove from the affected pasture, was impracticable, and no doubt accounted, in no small measure, for the tardy recovery in some cases.

In the Ewes.—The mouth and inside the lips were thoroughly washed twice a day with lin. saponis c. myrrh et Benzoin (Hewlett) in the proportion of 1 drachm to 4 ounces of tepid water, and then a lotion

containing alum (dispensed as liq. alumini acet.) was applied to the ulcerated portions. No internal remedies were given in either ewe or lamb.

In the Lambs.—Where mouth lesions were present they were treated similarly to the ewes. The foot lesions were treated by immersion in foot baths for five minutes twice a day of permanganate of potash, and afterwards dressed with alum lotion.

Duration.—The flock was free after a period of three-and-a-half weeks from the outbreak of the first case. During this time the sheep remained on the pasture.

Remarks.—It is well known that aphtha occurs amongst sheep when they are feeding off stubble, and also on pastures affected with "red weed."

In this case, it would appear that the enormous thistle crop was responsible, as the prickly leaves, no doubt, caused small lacerations in the skin and so directly inoculated the blight with which they were heavily infected.

It would be interesting to know if any other practitioner has encountered a similar outbreak.

THE ADMINISTRATION OF CHLOROFORM TO CATTLE.

By W. WALLIS, M.R.C.V.S.,

Barnet.

Now that the Animals' Anæsthetic Bill has become law it has become compulsory to administer a general anæsthetic to cattle for certain operations, and I am surprised to read in the professional journals that there is a widespread opinion that the use of chloroform for cattle is exceedingly dangerous.

It has been my practice to use it very frequently during the past twenty years, especially in cases of dystokia and coercion of the uterus. The method I have adopted has been to tie the animal to a post or to the front of the byre or loose box, by means of a rope placed round the horns, and to apply a couple of ounces of chloroform, to commence with, on a sponge placed in the canvas purse string end of a Cox's inhaler, the latter being placed over the whole of the muzzle.

I then take hold of the tail, and in the majority of animals, in about five or seven minutes, the cow will sway a little from side to side and quietly sink down. I then wrap a sack or light rug around the mask and proceed with whatever the operation is in hand.

As a rule, two ounces given in this way will produce a satisfactory anæsthesia lasting about 15 or 20 minutes, but if necessary I add more chloroform in half ounce doses.

When the operation is completed, I remove the mask and allow

the cow to lie quietly until she is fit to get on her feet. When "coming to" I have noticed that one of the first symptoms is that the patient will commence to kick the ground, or anything, such as boards or stones, which are within range.

I have anaesthetised a large number of cases, without a single fatality, and I shall certainly never again attempt a case of dystokia or everted uterus without first applying the chloroform inhaler.

BITCH SUCKLING SIX LITTLE PIGS.

THIS photograph, brought to our notice by the Editor of "Our Dogs," and for which we are indebted to the courtesy of the Editor of a French paper, *La Vie à la Campagne* represents an Alsatian wolf-



AN UNUSUAL FOSTER MOTHER.

hound bitch, whose puppies had died, bringing up six little pigs who had, through the death of the sow, been rendered motherless. Bitches will often bring up kittens and other young ones of the canine or feline species, but the rarity of allowing little pigs to suckle in this way makes the photograph of more than ordinary interest to the veterinarian.

ECONOMICAL USE OF FEEDING STUFFS.

By J. J. GRIFFITH, B.Sc.

*(Lecturer and Legal Adviser in Agricultural Chemistry, University College of Wales.)**(Continued from page 357.)*

The following table shows the average composition of some of the samples :—

Water	11.56 per cent.
Albuminoids	20.62 ..
Oil	4.63 ..
Carbohydrates	52.79 ..
Fibre	4.41 ..
Ash	5.99 ..

The samples represented meals which were sold at prices ranging from 25s. to 38s. per cwt. Most of them were more or less suitable foods for calves, but, in the majority of cases, their prices were, to say the least, exorbitant. Possibly farmers would feel less inclined to purchase these meals if they realised that 32s. per cwt., a price commonly paid for them, is equivalent to £32 per ton. Most people will readily agree that it would be difficult to think of a possible mixture of foods whose ingredients would justify anyone in paying for it at the rate of £32 per ton. No farmer should experience any difficulty in preparing a very much cheaper mixture to be used as a calf meal. For instance, a mixture of oat meal, maize meal and linseed makes a very efficient meal for calf-rearing. If the calf tends to suffer from diarrhoea a little wheat flour may be added. For further information on this subject see Leaflet No. 142 of the Board of Agriculture.

SOME FEEDING STUFFS WHICH ARE NOT WIDELY KNOWN.

In order to assist farmers to widen the scope of their choice of concentrated foods the following observations may be made regarding various cakes and meals which in the past have been but very little used within the College area.

Earthnut, soya bean, cocoanut and palm kernel cakes are very useful concentrated foods which, until quite recently, were almost unknown to farmers in this country. They have been extensively used with very good results by German farmers for many years. Since the outbreak of war Germany has been unable to import these foods, and, consequently, they have been put on the market in this country in much larger quantities than has ever been the case before. Feeding experiments have conclusively shown that these foods may successfully take the place of linseed cake and the cotton cakes, especially for fattening animals and dairy cows.

Gram meal is used to some extent in some Mid-Wales districts. It is somewhat similar to beans and peas in composition. It is a useful meal in cases where it is advisable to raise the albuminoid content of a ration.

BYE-PRODUCTS FROM MAIZE.

In the manufacture of starch and other substances from maize various residues or bye-products are obtained which are largely used for feeding. The following are some of the most important of these bye-products:—Maize bran, maize germ meal, maize points, gluten feed and gluten meal. The chemical composition of these feeding stuffs is very variable. Generally speaking, they contain less carbohydrates but more oil and albuminoids than maize meal, and they usually contain a higher percentage of fibre. They have been found to give good results when fed to dairy cows. On account of their variable composition they should be bought on a guaranteed analysis. It should be observed that whereas maize meal is marketed in sacks containing 240 lbs. the weight per sack is variable in the case of the bye-products, and is often much lower than 240 lbs.

VALUATION OF FOODS.

For practical purposes the "Food Units" system is the simplest method to ascertain which of several feeding stuffs is relatively the cheapest.

Both the albuminoids and the oil foods may be assumed to be approximately $2\frac{1}{2}$ times as valuable as the carbohydrates. So, the number of "food units" per ton may be obtained by adding together the percentages of albuminoids and oil, multiplying the result by $2\frac{1}{2}$, and adding the product to the percentage of carbohydrates.

Example.—

	Earthnut Cake.	Decorticated Cotton Cake.
Albuminoids %	47	40
Oil %	8	9
Adding	55 $2\frac{1}{2}$	49 $2\frac{1}{2}$
Multiplying	110 $27\frac{1}{2}$	98 $24\frac{1}{2}$
Carbohydrates %	137 24	122 27
Food Units	161 $\frac{1}{2}$	149 $\frac{1}{2}$

Therefore earthnut cake and decorticated cotton cake contain approximately 161 and 149 food units respectively. Consequently when the market price of decorticated cotton cake is found to be, say, £12 per ton the equivalent price of earthnut cake would be—

$$\frac{12 \times 161}{149} \text{ @ } £13, \text{ approximately, per ton.}$$

So, if earthnut cake could be purchased at the time at a more favourable price than £13 per ton it might be chosen in preference to decorticated cotton cake.

It is only in cases where the foods to be compared are of a similar nature that this method of valuation is applicable. It would not be

a reliable method, for instance, to compare the values of cotton cake and wheat bran.

Wherever possible, the *guaranteed percentages* of albuminoids and oil in the foods should be employed in using this system of valuation. The average percentage of carbohydrates as given in the table on page 353 may be used. As a rule it is not possible to calculate the values of compound feeding stuffs because the percentage of carbohydrates is not given. This is one of the many disadvantages connected with the use of this class of foods. For the "food units" value of various foods of average composition see the last column in the table on page 353.

THE USE OF BOG HAY.

The staple winter food of cattle in many districts within the College area is bog hay, *i.e.*, hay obtained from peaty land. This type of hay is occasionally made up of a fairly mixed herbage, but, as a rule it consists mainly of one species of grass, *viz.*, Purple Molinia (*Molinia cærulea*). It seems to be generally recognised that this kind of hay, especially when it constitutes the bulk of the daily ration, possesses some well marked characteristics in its effect upon stock. Briefly stated, the general opinion seems to be that—

- (a) its "binding" tendency is greater than that of hay obtained from non-peaty land ;
- (b) for young cattle, say under 12 months old, it is not a suitable food ;
- (c) when supplied to cattle over 12 months old it does not seem to encourage "growth," but it is particularly efficient for maintaining a store animal in good condition and even for bringing the animal from a store to a "half fat" condition.

Several samples of this type of hay, obtained from various districts, have been analysed at the College laboratory. The following table shows the average composition of the *dry matter* of these samples. For convenience of comparison the average composition of the dry matter of meadow hay from non-peaty land is also shown.

	Bog Hay.	Ordinary Meadow Hay.
Albuminoids	8½ per cent.	10 per cent.
Oil	2½ "	3 "
Carbohydrates	54½ "	47 "
Fibre	31 "	32 "
Ash	3½ "	8 "

The above figures indicate that the most distinctive feature of the composition of bog hay is its very low ash-content. This probably, to some extent, accounts for its unsuitability for young stock, and

its inferiority as a food to encourage animal growth. In albuminoids, oil and carbohydrates it does not compare very unfavourably with ordinary hay. It would thus appear that the value of bog hay as food for stock might be greatly improved by including in the daily ration a suitable quantity of other foods in order to make up for some of its deficiencies. A small daily allowance of ordinary hay, cereal straw, and roots might suffice for this purpose. It often happens, however, that the supplies of these home-grown foods are very limited in the upland districts where bog hay is extensively used. Under such circumstances it would be essential to use some purchased concentrated foods in order to make the best and most profitable use of bog hay. It should be observed that maize meal alone, on account of its binding tendency and low ash-content, would not be a suitable concentrated food for this purpose. A mixture containing bran, crushed oats and some oil cake such as soya bean cake, earthnut cake or linseed cake, would be likely to give good results. Such a mixture would counteract the astringent properties of the hay and would provide the much-needed mineral matter for bone formation and albuminoids for the formation of flesh.

CEREAL STRAW USED FOR LITTER.

Much valuable fodder is wasted by using cereal straw as bedding for farm animals. On most Welsh farms the area of land under corn is comparatively small, and therefore most if not all of the straw might readily be used as fodder. In most districts bracken, rushes and any vegetation of waste lands left behind in grazing might be utilised for litter. In this way the farmer might not only add to his supply of fodder but also increase the amount and even improve the quality of his farmyard manure.

PREPARATION OF FOODS.

In addition to a consideration of the chemical composition of foods the question of palatability should receive attention in the building up of rations. This is of special importance in seasons such as the present when much of the hay and some of the corn have been harvested under unfavourable weather conditions.

At one time the practice of cooking foods by steaming or by boiling in water was much advocated. In the case of pigs it is still the practice to cook most of their food. As regards the feeding of other farm animals, however, it is only in so far as a certain amount of the concentrated food may be presented in the form of a mash or gruel that there is much cooking practised throughout the country generally. But in many parts of Wales some of the hay and straw are still subjected to a process of cooking. The cooked products are variously named in different localities—'*breci*,' '*swpyn*,' '*swci*,'

'*stwciaeth*' and '*lwts.*' In the preparation of these substances either hay or corn is treated with hot water. The resulting liquid, usually called *breci*, is used to some extent as a substitute for milk in rearing calves. The residue after pouring away the liquid is, as a rule, mixed with a little meal and supplied to the dairy cows. It is claimed that the yield of milk is thereby greatly increased. Sometimes the hay and corn are used in the "long" condition in the preparation of these products, but, as a rule, both the hay and the corn-sheaves are chaffed before the cooking process is carried out. With some farmers cooking is practised only with hay and corn which have been badly harvested and are not relished by stock. In other cases, however, the operation is conducted even when all the hay and corn have been secured in good condition.

At the present time, in view of the great scarcity of labour, one should consider very carefully whether there is sufficient justification for the use of cooked foods. According to the results of the most trustworthy feeding experiments, cooking lowers the digestibility of the albuminoids of hay and straw. This depression in digestibility may counterbalance any benefit which might be expected to accrue from improved palatability. When we consider, in addition, that the operation of cooking coarse fodder involves a considerable amount of labour and expense it is very questionable whether it is wise to recommend the practice under any circumstances.

Generally speaking, the cheapest and most efficient means of making food more attractive and palatable is to provide a satisfactory variety of foods, and adopt a suitable method of blending or mixing various foods. Any hay or straw which is not relished by stock may be chaffed, mixed with pulped roots together with a sprinkling of salt, and the mixture allowed to stand for about twelve hours. As a result of the slight fermentation which is thus brought about, assuming that overheating is avoided, the food is much improved as regards digestibility and palatability. Should the necessary supply of roots not be available treacle, diluted with water, may be used as a substitute. Further, the addition of a little locust bean meal would render the mixed food still more agreeable.

The few suggestions contained in this leaflet may indicate some of the directions in which many farmers might practice greater economy and also attain a greater degree of efficiency in feeding farm animals. At the same time it must be remembered that each farmer must consider for himself what, under his own special circumstances, are the changes and improvements he may effect in the management and feeding of stock so as to bring himself a better monetary return and, at the present juncture, increase the food supply of the country.

Parliamentary.

LIEUTENANT-COLONEL BURGOYNE : To ask the Secretary of State for War whether a veterinary officer has recently been appointed head of the Remount Department in India ; and whether the same system of appointment obtains in Egypt and the Colonies.

Lieutenant-Colonel Burgoyne, Monday, July 26, 1920.

MR. CHURCHILL : I am informed that an officer of the Veterinary Department has been appointed Director-General of Remounts in India. The Deputy-Director of Remounts in Egypt is an artillery officer, and in Mesopotamia is an officer of the Indian cavalry. There are no such appointments under the War Office in the Colonies.

LIEUTENANT-COLONEL BURGOYNE : To ask the Secretary of State for War if he will state the numbers of officers of the Remount Department and the Royal Army Veterinary Corps, respectively, employed in June, 1914, and June, 1920 ; and whether he will state what are the duties performed by the Remount officers which could not efficiently and more economically be carried out by the Royal Army Veterinary Corps.

Lieutenant-Colonel Burgoyne, Monday, July 26, 1920.

MR. CHURCHILL : Number of Royal Army Veterinary Corps officers :—June, 1914, 79 ; June, 1920, 80. Number of officers of the Remount Department :—June, 1914 : At War Office, 4 ; in commands, 112. June, 1920 : At War Office, 4 ; in commands, 111.

All the above Remount officers, with the exception of those employed in the Remount Directorate at the War Office, are officers on the retired list. Retired officers of the Royal Army Veterinary Corps are equally eligible with other retired officers for these appointments.

Correspondence.

THE RAT PROBLEM.

To the Editor of THE VETERINARY JOURNAL.

DEAR SIR,—In the May issue of the *Melbourne Journal of Science and Industry* is a reprint on the Rat Problem, taken from your journal and written by Thos. Parker, F.R.C.V.S. I don't know what issue. He refers to my system of rat destruction and says : “ Rodier claims that by the present system or methods more males are caught than females.” This is not so and is misleading, as he should have added, “ in proportion to the numbers of each sex born,” or where the rats are in equal sexes.” In the *Melbourne Herald*, of January 15, 1920, is a statement as follows : “ From investigations made in the past three weeks it has been discovered that in Melbourne, female rats predominate by about four to one.” This great difference of the sexes may

not exist generally, but the fact is established that the rats are polygamous, that is, the females are much in excess of the males. Other counts have confirmed this, not only in Melbourne, but in other places. This shows my statement to be correct, that the males have been killed. Not only that, but because of the rats being polygamous, more females are born than males, and so their numbers increase (in proportion to the numbers of males killed) *ad infinitum*, like the proverbial snowball, or the notorious chain letter—the longer they continue, the greater the increase. Now, why kill the males?

Another misleading statement is where he says "again it would be equally essential for all districts to be operating continuously in the same direction, otherwise, having regard to the migratory habits of the rodents, the scheme would be hopeless." I take exception to these remarks and say it is not so, and ask him how he knows this. Rats are not naturally more migratory than any other animal; it is the fact that they live where humanity is dense that causes them to inhabit ships, trains, large cases of merchandise, etc., and so get conveyed from place to place, that has caused them to spread all over the world and gain the reputation of being migratory, which they are not. Any one municipality following the scheme on its own, will get better results than by any other method; it is also cheaper, quicker, simpler, and free from all drawbacks, a thing no other plan can claim. Not only that, it is the only scheme that works on the mutual benefit system, and so benefits adjoining places at no extra expense. When you consider that the present methods have been in use for 3,000 years (see W. R. Boelter's *The Rat Problem*) and utterly failed, it shows a great want of business acumen to continue using them, as failure is a certainty. There is little doubt that if the authorities governing this rat problem, in any one of the municipalities, would only put their prejudice on one side and give the scheme a fair and straight-out trial on its merits, they would soon get rid of the rats and they would then wonder why so simple and safe a scheme had not been tried before.

Thanking you in anticipation,—I am, yours faithfully,

327, Collins Street,
Melbourne, Australia.

WM. RODIER.

NOTICES.

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*(Chief Veterinary Inspector to the City of Birmingham and Secretary
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THE VETERINARY JOURNAL

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NOVEMBER, 1920.

THE LATE MR. JOHN MALCOLM, F.R.C.V.S., F.H.A.S.

PRACTITIONERS and students alike will have read with regret of the great loss the veterinary profession has sustained by the sudden death of Mr. John Malcolm. A practical man, he was one of those whose principle had been to "act," and not merely "talk." His quiet and genial manner gave confidence at once, and marked him out as a man who had something behind him, and the diffident or nervous student when, in front of Mr. Malcolm at the examination table, was at once at his ease. The student, in particular, will remember his name with gratitude. For the practitioner, his patient investigation into the treatment of Canker, and his researches into the economics of horse feeding have become standard treatises, and bear the hall-mark of sound, practical knowledge, gained by actual personal experience.

For the profession itself, however, the chief thing in which Malcolm was pre-eminent was the organisation of Municipal Veterinary Work, and in this he was the pioneer. The city of Birmingham, whose Veterinary Inspector he was for many years, soon found his worth, and to his care was entrusted the whole of the Borough Municipal duties, which by right should be allotted to a duly qualified veterinary surgeon. It was never necessary, after once he had become established, for Mr. Malcolm to fight for his rights. They were handed over to him as a matter of course; and the economy and pecuniary saving due to his advice and management was alluded to and recognised in the Council on more than one occasion. That he had, too, the confidence of the Council of the Royal College of Veterinary Surgeons is shown by the fact that he had for many years been an examiner

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for both the Membership and the Fellowship Diplomas, whilst, by the unanimous vote of the National Veterinary Association, he had been elected Secretary. Had he lived a few weeks longer his retirement on pension would have taken place, and his intention then was to have devoted his time to the affairs of the National Veterinary Medical Association and the editorship of their recently-purchased journal. His unexpected demise leaves a blank in our profession which it will be difficult to fill, and the sympathy of the profession is extended to his bereaved family.

Editorials.

COMPETITIVE TENDERS FOR PROFESSIONAL SERVICES.

A RESOLUTION under the above heading, brought before the Council of the Royal College of Veterinary Surgeons at their last meeting, gives much food for reflection, and exposes a custom which ought, when considered from every point of view, to be put a stop to. Brought forward by Mr. Howard it reads: "That in the opinion of this Council the practice of certain public bodies in advertising veterinary appointments as open to tender, is opposed to public interests and ought to be abandoned. Furthermore, the Council is of opinion that members of the profession should decline to apply for appointments offered on such conditions." The motion was carried unanimously and it now remains for the profession to loyally support the Council's wishes. "Tendering" is a term which can only be applied legitimately to trade functions and should never be submitted to by members of a profession. Its cut-throat policy was well illustrated by the instance read from a Lancashire newspaper by Mr. Locke, in which a veterinary surgeon was stated to be in complete veterinary attendance upon a Corporation stud of 98 horses (divided up between stables at four different places) for £30 per annum. And this in 1921, with the present value of the sovereign! Such fees are a disgrace and lower the profession inestimably in the eyes of the public. It is well that the matter has been taken up, and it is to be hoped that any others of the same character will be brought to the notice of the Council.

THE INDIAN CIVIL VETERINARY SERVICE.

On a further page we publish an article by "Anglo-Indian," also the copy of a Memorial which has been forwarded by the members of the Indian Civil Veterinary Service to the Secretary of State for India, which speaks for itself in regard

to the financial position in which its members find themselves at the present rate of exchange and the low purchasing power of money. Comment upon it, except to wish the petitioners a successful issue and to bring before the general body of the profession the difficulties expressed therein (as a guide to those of our younger men who contemplate entering this Service) would at the present time, perhaps, be prejudicial. The high authorities who will consider it know well the value of the Indian Civil Veterinary Officers for the welfare of the agriculture and the stock of the country; they know well, too, the present financial aspect and the necessity for the maintenance of the white man's status. Whilst wishing our *confrères* a favourable response to their demands, we are sure that the authorities will consider the question from every point of view and adjudicate fairly. Our new graduates will watch the result with interest, and any intending candidates at the present moment will do well to be circumspect and move with caution. Let him weigh carefully the article by "Anglo-Indian" in the present issue, as it is written by one who knows the I.C.V.D. conditions "from A to Z."

Clinical Cases.

SARIA.

By H. H. CURSON, M.R.C.V.S.,
Grahamstown.

THE above term is applied by the Wankonde natives to a peculiar form of dermatitis affecting cattle in their country.

This dermatitis is usually of a chronic eczematous nature, and is apparently different, in many of its characters, from other forms of tropical dermatitis, such as described by:—

- (1) Van Saceghem, of the Belgian Congo;
- (2) Armfield, of Northern Rhodesia;
- (3) The dermatitis accompanying or following Demodectic Mange, described by Griffiths, of Nyassaland, and
- (4) The dermatitis sometimes following rinderpest.

Before proceeding to describe the condition some information, with regard to the Wankonde and their country would not be out of place.

Geography.—Unkonde (*i.e.*, the country of the Wankonde) embraces the area of country situated at the north end of Lake Nyassa (in late German East Africa) in the district of New Langenburg. It is bounded on the east by the formidable mountain barrier—the Livingstone

Mountains ; on the north by the Poroto Hills, Igale Mountains, and Malila Plateau ; and on the west by the Songwe River, the old boundary line between British territory—Nyassaland—and German territory. There are Wankonde living on the Nyassaland side of the Songwe, but, owing to rinderpest, their cattle had been removed south of the Stevenson Road—twenty miles distant—to form a cattle free belt. I did not see these cattle, but natives informed me that “ Saria ” existed in their herds.

Native Cattle Management.—The cattle are taken to graze early in the morning, and brought back to be milked at midday. They then return to the veld, and are fetched again in the evening. One interesting fact is that the cattle are housed at night in the same dwelling as the owner, there being only a partition to separate the owners from their stock, each beast being tied side by side to posts which are fixed into the ground. The natives are splendid cattle managers, and take every possible care of their stock, e.g., bedding is often provided, especially during the wet season ; the cattle are brought in during a storm and ticks are usually pulled off. No other tribes were observed to take such an interest in their stock.

Cause.—The direct cause cannot be stated definitely. Microscopic examination of the serum exudate and affected skin area may show cocci, but this cannot be considered diagnostic, as cocci may be found in scrapings from healthy skin. In a few cases organisms resembling *Bacillus necrosis* were seen, the filaments showing darkly staining specks in a lighter background when stained with methylene blue.

Predisposing causes are :—

- (1) Cattle with unpigmented skin ;
- (2) Age ; calves and young cattle up to three years are seldom affected.

Other interesting details are :—

(1) Personally, I have never seen a bull with the complaint. Natives stated that it was seldom that a bull was affected.

(2) Cattle are housed at nights, the house, as can be readily understood, being filled with smoke. Other tribes, e.g., Wanyika, keep their cattle out of doors, and of 7,940 Wanyika cattle that passed through the rinderpest inoculation station at Mbosi in 1918, not a single one showed “ Saria.” At this station only one beast was affected, and this came, along with thirty-three others, from the Malila country on the borders of Unkonde.

(3) The cattle usually affected are “ good milkers,” and in this connection it is interesting to mention that the natives prefer these “ Saria ” animals. When a father is presenting cattle to his son for the purchase of a wife, he will not part with a “ Saria ” animal if he has one,

but will keep it for his own use. We know ourselves that a fine skin is generally associated with a good milking strain, and it is usually this type of skin that is predisposed to inflammation and other pathological conditions.

With reference to the first predisposing cause, *i.e.*, non-pigmentation of the skin, let us see how the skin is sometimes affected when exposed to the following conditions :—

- (a) *Extreme heat*.—In the Karroo, white pigs suffer from a dermatitis apparently due to the sun. If in the shade, and allowed access to wallowing ponds, this condition rapidly improves.

It cannot be that heat only has this effect in “Saria,” for it is prevalent from the shores of Lake Nyasa (1,700 ft.) to the slopes of Mount Rungwe (5,000 ft.), where the climate is temperate and more pleasant than in parts of the Karroo.

- (b) *Fagopyrismus*.—Caused by feeding on buckwheat (*polygonum*). Here it is said exposure is not necessary directly the plant has been fed, but it may follow some weeks after plentiful feeding. Lesions appear chiefly about the head, and they take the form of an erythema, slight swelling, itching, and finally desquamation. In severe cases the exudation is copious, appetite is interfered with, and brain symptoms may result ; but recovery should take place if the animal is properly cared for.
- (c) *Trefoil dermatitis*.—Due to feeding on *Medicago denticulata*, and being exposed to the *direct rays* of the sun. Characterised by “erythema and inflammatory œdema of the skin with exudation,” *i.e.*, unpigmented portion of skin.
- (d) *Clover dermatitis*.—Has been described in Europe as affecting horses, cattle and sheep. The ingestion of *Trifolium hybridum* or *Trifolium pratense* is supposed to be the cause of symptoms somewhat resembling those described under trefoil dermatitis.
- (e) *St. John's Wort*.—In America hypericum is stated to produce the same form of dermatitis as is caused by the eating of trefoil and subsequent exposure to the sun.
- (f) *Geeldikkop in South Africa*.—(Dutch equivalent for yellow thick head).—In the Karroo sheep are sometimes affected by a peculiar disease evidently of the same nature as the above, especially as described under *fagopyrismus*. The head swells, this being due to a yellow fluid accumulating under the skin and the ears become inflamed. A certain plant, *Tribulus terrestris*, called by the Dutch “dubbeltje doorn,” is held responsible, for, if sheep are removed from a “dubbeltje” grazing area, the disease disappears.

- (g) *Vuurziekte*—(Dutch equivalent for Firesickness) is a term applied generally by South African farmers to any dermatitis affecting sheep, goats or cattle, and of which the cause is obscure, e.g., "witroes" in Angora kids, an eczematous condition about the head and neck, and affecting animals in a poor condition, and suffering from wire-worm. Cattle sometimes suffer from a dermatitis of unpigmented skin, but, as the cases are so few, they hardly attract attention. More often the Friesland or Cape cow shows a plain erythema of the white skin, but this seldom develops into anything approaching a dermatitis. Such conditions would be called "*Vuurziekte*" by farmers.



FIG. 1.

THIS ANIMAL HAD BEEN ROUGHLY HANDLED DURING RINDERPEST INOCULATION AND THE TWO MARKS SEEN ARE THE RESULT OF BLOWS.

The veld in Unkonde is "sweet," and contains a large proportion of leguminous plants, including trifolium and medicago; also species of *Rumex* (dock), but from observations it was noticed that the latter were never eaten.

As far as could be seen the veld in Unyika and Ukinga was very much like that in Unkonde; but where Unkonde differs from the other two is in regard to rainfall; it is very heavy, exceeding 100 inches a

year, and it may be that this great moisture is favourable to the growth of certain moulds or bacteria or has some influence on vegetation.

“SARIA” AFFECTING A COW FROM THE HIGHLANDS.
(Malila Plateau).

Disease : Course of Symptoms.—The first symptoms is an erythema, usually at the back of the base of the hump (see Fig. 1) ; although it may occur at the middle of the back—such as may be seen in the black and white cow of Fig. 2. There is heat and the area is a little painful. Since it is only unpigmented skin that is involved, redness is well marked. It is always the top of the back or loins, or the back of the hump that first becomes affected, and then later the sides, along the shoulders, flanks or quarters.

After a varying period the coat either becomes very thin, owing to the hairs falling out, or minute drops of serous exudate appear, which mat several hairs together, and a crust is formed, which, if pulled or removed by the beast rubbing itself, causes the hairs to be shed, leaving often small raw patches, which become covered with a *thin* dark brown scab. This scab in time is shed, leaving a dull red scar. Sometimes the complaint remains localised, but the inflammation persists and the skin becomes thickened, and the hairs that remain are short and do not lie flat. The herd boys are always cautioned by the elders not to strike “Saria” cattle with a stick, for, as is seen in Fig. 1, the slightest blow leads to the skin being removed, bleeding, and the formation of a wound. At other times there is an extension of the dermatitis along the unpigmented areas. In Wankonde cattle it is seldom seen that poor condition aggravates the malady, neither in severe cases are systemic symptoms, e.g., decrease in milk yield noticed, nor does death result from even a general infection. The white cow in Fig. 2 was affected very badly along the hump and the back, and the disease was encroaching along the sides, but her condition remained excellent. The black round spots seen in the photo are pigmented areas (black) which are remaining healthy. In old cases the skin becomes thickened and wrinkled, and the coat is thin, rough and dull.

“SARIA” AFFECTING COWS FROM LAKE SHORE.
(Ipiana).

In many cases where the irritation is not so severe, and the beast is not struck or injured in any way, e.g., by poking, the inflammation subsides, serum no longer exudes, and new hair makes its appearance. There always remains, however, a thickened condition of the skin, which can easily be felt by manipulation. Season does not appear to

have any influence with regard to the severity of the lesions, and cases are to be seen at any time of the year.

It does not appear that "Saria" is contagious in any way, for healthy animals may be housed with infected animals for years and not become affected. It has been endeavoured by rough experiments to transmit the complaint by rubbing serum and scrapings into wounds, but without success; not does it appear to be hereditary.

It is the rule to find about five per cent. of the cattle affected; this percentage holds good for any part of the country, whether in the highlands or along the lake shore.

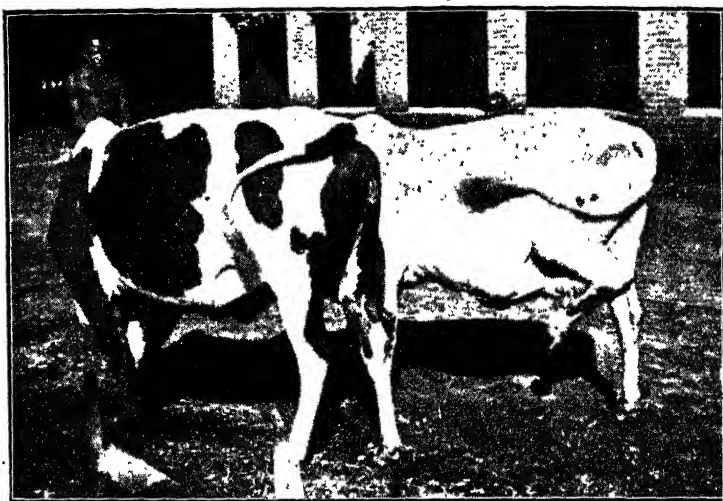


FIG. 2.

THE DERMATITIS COMMENCED IN THE BLACK AND WHITE COW IN THE MIDDLE OF THE BACK. THE WHITE COW IS SEVERELY AFFECTED ALONG THE HUMP, BACK AND LOINS AND THE DERMATITIS IS EXTENDING DOWN THE SHOULDERS, FLANKS AND HIND-QUARTERS, LEAVING UNAFFECTED THE BLACK PIGMENTED SPOTS.

"RINDERPEST" SKIN LESIONS.

Differential Diagnosis.—(1.) Van Saceghem's description of Congo dermatitis:—As I have seen no photo of this condition, and can only judge from the information conveyed by the summary appearing in *The Tropical Veterinary Bulletin* for June, 1917, it is difficult to form an opinion.

- (a) It is claimed that the causal organism, the *Dermatophilus congolensis* is a filamentous bacterium, which is sometimes branched, *i.e.*, Streptothrix, and sometimes represented as cocci. The *B. necrosis*, which is found in many pathological

conditions, e.g., necrosis of the mouths of sucking pigs, and which was probably present in a few of the scrapings examined, does not branch (leptothrix).

- (b) That the disease may be identified by the formation of crusts over which the hairs are erect. This is the same with "Saria," the crusts being dried serum.
- (c) Rapid spread.
- (d) Young and adult animals affected similarly.
- (e) Acute only during wet seasons.

In these last three characters "Saria" is in no way similar.



FIG. 3.

THE DARK RED CALF WAS SUFFERING VERY BADLY AND BLOOD WAS EXUDING FROM THE FISSURES ABOUT THE SHOULDERS AND PRECURL REGIONS DURING MOVEMENT.

- (f) Lastly, apparently Congo dermatitis may affect black pigmented skin, whereas "Saria" was not observed by me to do so.
- (II.) Armfield, of Northern Rhodesia, in *The Veterinary Record* of January 5, 1918, describes a dermatitis showing :—
- (a) "Numerous small wart-like processes, about $\frac{1}{4}$ inch in diameter, and if these are pulled off small hollows are left in the skin." In the number of *The Tropical Veterinary Bulletin* for June, 1917, Van Saceghem describes tumours in a heifer, and, from

the context, he evidently described these occurring as a complication of Congo dermatitis. It may be stated that this is not the case in "Saria."

- (b) "Clean animals herded for several weeks with diseased animals become affected."

"Saria" differs from the above in both respects and the excellent photos of Mr. Armfield (seen in *The Veterinary Record* of January 5, 1918) appear to show different lesions. Scabs in "Saria" are only seen as a result of removal of skin by blows or injuries, and wart-like growths are not present, so that it is difficult to obtain photos that would show anything but a loss of hair.

(iii.) In the dermatitis accompanying demodectic mange there are nodules in the skin, and if their contents are examined by a microscope, it is generally possible to find the *D. folliculorum*.

(iv.) The skin lesions of rinderpest are present a long while after the other symptoms have ceased, but the intense scouring has left the beast weak and emaciated. As will be seen in Fig. 3, the lesions, which in severe cases take the form of ulcers with the shedding of the hair around them, may extend all over the head, neck, trunk and limbs. When scabs form, there being so many present, the skin shows cracks, through which the blood may appear if animal is driven about quickly. In some cases small areas of skin become dry like parchment, separate from the surrounding tissue, and fall off, leaving a raw surface.

The literature on tropical skin diseases of animals is unfortunately scanty, and there remain many problems still to be solved. If only veterinary officers would record their experiences and investigations, however humble they may be, much of the uncertainty that at present prevails would be cleared up. This is an attempt in this direction, and it is hoped veterinarians who have been in the tropics will be persuaded to describe their observations.

Literature :—

- (a) "Trefoil Dermatitis," by Dodd; *Journal of Comparative Pathology and Therapeutics*, March, 1916.
- (b) *Tropical Veterinary Bulletin*, June, 1917.
- (c) *Veterinary Record*, January 5, 1918.
- (d) *Veterinary Record*, May 18, 1918.

P.S. Since writing the above, I have read with great interest in THE VETERINARY JOURNAL of June, 1920, the article by Hornby of Northern Rhodesia on "A Contagious Impetigo of Cattle." Until the *Dermatophilus congolensis* is demonstrated in cases of "Saria" it does not seem possible to consider these two diseases as being identical.

TURTLES.

By E. MORGAN, M.R.C.V.S., D.V.H.,
Puerto Cabello.

I WONDER if those fortunate ones who are often guests at some lavish dinners, as well as those "would-be guests" who attempt to gratify themselves by reading the "menu" or list of such feasts in a morning paper, are all quite clear in their minds as to what one of the first words on the list means, viz., *Turtle*, in the familiar item *Turtle-soup*. Does this turtle mean bird, fish, mammal, reptile or herbivora? Folk are apt, when hungry, to swallow the first courses without asking questions, whereas lower down the menu scale they get more inquisitive, and undoubtedly some of them would frown at this stage should the waiter be familiar with zoological terms and offer them reptile-soup or extract of reptile. After looking at such things from several points of view, we must admit that there is something in a name; and I doubt if turtle-soup by the name of reptile-soup would taste as sweet to those of delicate palates.

In these few scattered notes it is not my intention to deal with the sea-turtle of South America from a zoological point of view, but just to mention a few points as I have seen them myself, and which might be useful to students of meat inspection. The word turtle in Saxon meant turtle-dove, a bird, and not a reptile, and the English word had the same signification until the discovery of America, when sailors gave the name of turtle or turkle to the marine chelonians of the West Indies—(*New. Am. Cyc.*).

The term was probably given to this reptile on account of its affection for its mate in pairing time, as in such respects it resembles the turtle-dove, which is celebrated for the constancy of its affection and is regarded as the most perfect emblem of connubial attachment.

The turtle which concerns us here is a marine reptile, which in shape is more or less oval and flattened from above and enclosed in a case formed by two scaly shields or shells, and having horny jaws in the place of teeth. The dorsal shield is called the "carapax," and the ventral the "plastron." The former is more convex and of darker colour than the latter. The only parts exposed outside the hard shells are the head and neck, the four wing-like limbs or flappers and the short conical tail. The term tortoise is restricted to the land form. Yet the shell of one class of sea-turtles called "carey," or hawk's-bill turtle (*Chelonia imbricata*), is often referred to as tortoise-shell, and is of high commercial value for making combs, etc. There are also fresh water turtles.

Little does the veterinary student think, whilst studying the blood circulation, etc., of these reptiles, that he might some day be called to examine thousands of these herbivorous sea-reptiles, whose flesh and eggs are esteemed a great delicacy and highly valued for food.

These are found along the coast-line of some of the South American republics as well as the West Indies. They live most of the time in the sea, but being amphibious they often come up to the surface to breathe. During the laying seasons they come ashore, and also often during the mating season, but not always. They lay their eggs in a fairly deep hole which they scoop in the sand. Their diet consists chiefly of fine green sea-grass or weed. Yet when kept in captivity, such as sea-water tanks, they will eat coarser grass, hence my reason for referring to them as herbivorous sea-reptiles. They will also eat meat, fish and bread. Great care is needed that the fish is clear of bones, as they are apt to get choked with fish bones. An average sized turtle when kept in these tanks and properly fed will increase in weight at the rate of about five pounds a month. They are kept in such places at certain periods, when there is superabundance in the market, such as is the case during the laying season, when they are closely watched in order to know the exact spot where they hide their eggs, and the turtles themselves are often captured at the same time. They usually lay their eggs during the Autumn months, especially during the course of Autumn winds, and also in February. It is estimated that each turtle lays about 800 eggs during the year. They are unlike birds laying only one egg a day. They lay 200 and more in a short time in a hole, which is at least one foot deep, and then immediately cover them with sand, so that neither man nor beast can discover them except by chance. It is said that once outside air gets in contact with the eggs after they are covered by the turtle they will never hatch again; this stands to reason, the same, more or less, as the case of bird's eggs getting cooled below a certain temperature after the bird has commenced to sit on them. The eggs are round in shape and there is absence of the hard shell. The turtles are caught in great quantities in the sea by means of nets. Also, as already stated, sometimes on shore. They copulate on land as well as in the sea. Once the male and female copulate, the male adheres to the female for at least forty days, hence the reason that they are so easily caught whilst ashore during the mating season. As far as the length of time of the copulating process goes on, they are not bad imitations of the elephants. The turtle-hunter always captures the female first, then he easily gets the male, as the male is either too weak to move, or, as it is believed, his devoted attachment to her is too strong. During the mating season they are often

seen floating on the waves, and appear at first sight as if only one turtle is present, as only the dorsal shell of each is exposed. When on dry land all that is necessary for the turtle-catchers to do is to capsize them, so that their wing-like flappers will not touch the ground, then they cannot escape from the spot. Turtles can be kept alive outside the water for seventy days if their eyes are sprinkled once a while with a little salt water, otherwise they will die in about thirty days, as the tears which are discharged form an opacity over the eyes unless water is sprinkled over them.

When the young ones are hatched they soon find the sea water, but remain in shallow water until they grow larger in size. Apparently no other living thing has more enemies than the innocent little baby turtles—even their own parents act as cannibals and devour them whenever they meet them. There is a bird along these coasts which is called in Spanish “Tijereta” (Scissors tail). A peculiar bird in shape and habits. It is the size, more or less, of a crow, and possesses very long wings. I am told that the bird never drops on the ground except by accident; sleeps at night on branches of trees along the coast. It is interesting the way this bird ploughs the waves with its beak in the water catching small fish, and tail and wings playing upright in the air. The reason that he never takes a rest except on the branch of a tree is because he cannot fly off the ground. Although this bird does not eat the flesh of young turtles, even when they are ashore, yet he drops like a dart and kills them wherever he gets an opportunity. The jaguar (South American tiger) is one of the worst enemies to the fully grown turtles; he hides and watches for hours so as to find out where the turtle lays her eggs, and of the two he prefers the eggs. Nevertheless, in spite of all their enemies, a great number of turtles survive.

The live weight of the turtles killed at the Puerto Cabello packing plant varies from 130 to 250 lbs. As the yield in weight of some of the parts might interest someone, I shall quote one out of many tests which I have made:—

Live weight of turtle ..	193 lbs.	Gullet, intestines, etc.,	
The different parts gave		as far as cloacal orifice,	
following yield, viz.:		including ovaries, etc.	34½ lbs.
Dorsal shell (carapax)	28 lbs.	Blood	12 „
Ventral shell (plastron)	12½ „	Sanguineous fluid which	
Heart	½ lb.	is always deposited	
Liver	3 lbs.	inside	4 „
Lungs	2 „		
Meat	95 „	Total	191½ lbs.

There is a difference of $1\frac{1}{2}$ lbs. between live and dead weight ; this is due to small clots of blood and fat being washed away whilst using the fresh water hose to clean the inside after removing the internal organs.

The turtles are bled the same way as sheep are bled, but there is a vast difference between the two, as depriving turtles of their blood is not sufficient to prevent movements of the body. They even move their jaws and wing-like flappers after all the internal organs are removed. Their hearts will beat inside the body cavity when no more blood can be drained from their blood-vessels. The small heart is composed of very thick muscle. They die a little sooner if stunned or pithed before being bled, but they do not seem to bleed so freely. The natives here, some of them, believe that a turtle will never die until sunset. I was interested to find this out, so we arranged one day to get a few killed in the late afternoon, but this made no difference, and the movements still continued after sunset, although deprived as usual of blood and internal organs. I might here mention that all the meat is left intact to the dorsal shell, as well as the head and neck and flappers ; then the ventral shell, after they are properly washed, is placed back in its normal position, this of course had to be removed in the first place in order to remove the internal organs and to clean the inside. The turtles appear in the freezing rooms as if all the parts are intact, nevertheless they are minus the internal organs, with the exception of liver and heart.

The length of the alimentary canal, including œsophagus, was 66 ft. It is of almost the same diameter throughout, and where one expects to find a fair-sized stomach there is only a kind of diverticulum or bend. The first portion of the œsophagus possesses numerous large papillæ on its mucous membrane, similar to those on the cheeks of ruminants. The lumen of the intestine is nearly twice the size of the small intestine of cattle, and the density of the intestinal wall is much thicker and harder. Unless the turtles have been kept a long time without food, one finds the intestinal canal throughout full of green food, and it is most interesting to follow it for 66 ft. to see the gradual stages of digestion.

The fat is of a dark-greyish brown colour, which one finds in a layer on the inner surface of the shells. Also, when the turtles are in very good condition, one finds a fairly thick layer of omental fat, which is of a yellowish colour.

Although these turtles live most of their time in the sea, yet they are not always free from abnormal growths. The other day I found a tumour weighing about half a pound inside the axilla. I also often find papillomatous growths in the neck regions about the size of

average hen's eggs. They do not indulge in tea, beer or whiskey drinking, neither do they suffer from the want of fresh sea-air, yet they are not always exempt from disease. Perhaps being tossed by the waves against rocks, or being injured when young, might be a direct or indirect cause of such growths.

AN INTERESTING CASE OF ABNORMAL LACTATION.

By FREDERICK HOBDAY, F.R.C.V.S.,
London.

SOME few years ago I had an interesting patient in the shape of a prize-bred female goat, who had given milk continuously for two years, without having been served a second time ; and her progeny (then two years old) who had never been mated at all, had been giving milk in considerable quantity for over nine months.

In canine practice one frequently meets with instances where a bitch will have sufficient milk to bring up a puppy without having puppies of her own or even without having been mated, and the following instance recently came under my notice :—

A wire-haired terrier bitch had a litter of six valuable pups, of which two were removed and fed by hand for one night, as it was thought that the six would be too many for the mother. These two were placed in a cigar-box filled with cotton wool and put near a fire. A fox-terrier bitch, about 5 years old, who had had a litter some two years previously, saw them there and immediately assumed guardianship over them. Much to her delight they were placed in a large box and she was allowed to "mother" them. At this time (11.0 a.m.) she had no appearance whatever of milk in her glands, but they nestled contentedly against her and on the next morning she had enlarged mammaræ and a full flow of milk, and she afterwards brought them up successfully.

PRESENCE OF *GASTROPHILUS EQUI* IN THE DOG.

By CAPT. J. R. HODGKINS, D.S.O., F.R.C.V.S.,
Secunderabad, India.

AN Aberdeen terrier, 18 months' old was brought for advice regarding a paralysis of the hindquarters that had been in existence for a day. He could not rise from the ground. A careful examination allayed any suspicion of Rabies, and a diagnosis was made of *Stercoremia*.

Intestinal lavage was carried out, first with warm soapy water and finally with cold water.

With the first vomition, three larvæ of the *Æstridæ* were brought forth.

On examination these were found to be larvæ of *Gastrophilus equi*.

They were quite blanched ; two were mature and one was much smaller.

No history of the dog's having been fed with material that could have contained these larvæ was available. It seems unlikely that they could have come to maturity in the dog. In all probability they were ingested.

An interesting point was that the dog, on being removed from the table, had lost his paralysis and walked home.

For accounts of larvæ of the *Æstridæ* in carnivorous animals, see "Parasites and Parasitic Diseases" (Neumann : 1905, page 314.)

CHRONIC LAMINITIS OF CATTLE.

By H. H. CURSON, M.R.C.V.S.,
Grahamstown.

ON May 31, 1918, while at Mbosi in connection with inoculation of Wanyika cattle for rinderpest, a native, belonging to Chief Msangawale, brought in eight head of cattle for inoculation. This native had come from the extreme N.E. portion of Msangawale's territory bordering on Chief Mweni Iwungu's territory, South of Lake Rukwa, and had taken $3\frac{1}{2}$ days to bring his cattle, the distance being about 40-50 miles. Of these eight beasts, two were old cows, three were young cows (two having calves), one yearling bull, and two calves about 4-6 months. The interesting feature of these cattle was that the five oldest were suffering from chronic laminitis and the bull and two calves were quite normal.

On interrogating the owner it was learned that the two old cows had been so affected for many years, whereas the young cows (about 4-5 years old) had only within the last two years developed this abnormal condition. He also stated that he was sure the bull and calves would later become affected and that his journey had been slow as the cattle had been handicapped by the deformity. His reply to a question asked about other cattle in his country being similarly affected, was that there were, and no one knew or had even wondered what the cause was. It might be stated here that cattle from this area had been inoculated at other rinderpest stations, but no veterinary officer had remarked on this complaint.

I tried to get some information from the owner regarding the onset of this disease, but all he could tell me was that at first the animals became very lame, had no milk, and then had to lie down. Later on, they got up with difficulty and walked stiffly about on their heels, with the result that the toes became long. There were laminations or rings on the hoof, but pain was absent, and the only difficulty in walking was apparently due to mechanical interference owing to overgrowth of

the toes. As the animals were being driven away quickly, the clumsy feet striking the stony ground gave out a loud tapping sound.

I was, unfortunately, not in a position to take photographs of these animals, but on looking up Sir Arnold Theiler's articles on "The Stijfziekte of South Africa," in the *Union Agricultural Journal* of June and July, 1912, a splendid photo in the July issue (page 2), showing an exact reproduction of the condition is to be seen.

In South Africa, Sir Arnold Theiler has proved that *Crotolaria burkeana*, a leguminous plant, is responsible for this condition, but whether *C. burkeana* is present in the Wanyika country I cannot say. The veldt is rich in leguminous plants, and the veldt near Lake Rukwa must be "sweet," because it is where game of all descriptions assemble for feeding during the dry season.

FOREIGN BODIES IN THE MOUTH, NOSTRIL, AND PHARYNX.

By F. T. HARVEY, F.R.C.V.S.,
St. Columb.

(1) Cow. She had exhibited some difficulty in breathing and swallowing for two days. The owner had administered drenches, had vigorously rubbed the throat and neck and applied mustard. The respiratory distress had increased considerably during the twelve hours preceding my visit. Temp., 105° F. A good deal of swelling around the throat and roaring respirations.

On examination, nothing was discovered in the mouth, but with the hand in the pharynx a foreign body was soon located in the upper part. It was a piece of wire about three inches long, and lying across the roof of the pharynx, both ends being buried in the tissues. It was withdrawn with comparative ease.

The breathing began to improve in about four hours, and in a few days the cow seemed none the worse.

(2) A mare four years old was reported as having something wrong with the tongue. On seeing the case, alveolar cellulitis was at once suspected, but a careful examination indicated that the tongue only was affected. The organ was protruded, swollen and very hard around the middle third. Symptoms had only been observed a few hours. A body was found almost buried in the dorsum of the tongue, towards the left of the middle third. It was carefully withdrawn and seen to be a stout needle, about two inches long. Recovery was complete in a few days.

(3) On a farm where the cattle are not seldom attacked with the ray fungus, we were requested to send medicine for "another case." At the end of a week no improvement was noticeable, so a request came to see the patient.

It was obviously a case of actinomycosis. Snuffling sound in breathing, nasal discharge, and both nostrils ulcerated. The muffle was involved and also the hard palate. Exploring the left nostril with the left forefinger, a sharp stabbing pain was immediately felt—a pricked finger. Presently a piece of bramble was withdrawn with the forceps. It was about four inches long, the barbs pointed towards the opening of the nostril and thus prevented the animal blowing out the twig during attacks of sneezing or similar efforts. Potassium iodide internally, with local applications of iodized phenol ended in the case recovering. Nothing happened to the finger for about three weeks. It then became painful, and congested around the seat of the puncture. The part was frequently dipped in tincture of iodine and ultimately the pain passed away and the inflammation disappeared.

It might be a question here as to whether the foreign body started the infection by wounding the tissues, or whether the animal rubbing its nose against the bush to allay itching, etc., already existing, had thus inadvertently introduced the bramble.

All three are commonplace cases, but they will illustrate the importance of a careful first examination, and that we should always be on the look-out for the unexpected. An overlooked or missed foreign body is always a potential disaster wherever it may be situated.

INTESTINAL CALCULUS.

BY W. F. ASTON, M.R.C.V.S., LATE CAPT., R.A.V.C.
Ludlow.

ON the night of April 2, I was called to attend a bay gelding, purchased at an Army sale, over twelve months previously. The horse had worked on a farm during that period, and at the time of his illness was out at grass, having feeds of corn on working days. My diagnosis was a simple impaction and gave stimulants and eserine. I was somewhat surprised to find no change in the morning. There were intervals of perfect relief, with an inclination to eat when permitted, complete constipation, no very violent pains and a strong pulse. After rectal explorations I failed to feel a stone, though suspected its presence. The patient's condition remained much the same for five days, when possibly as the result of copious enemata three times a day the bowels started to act. Uninterrupted recovery took place, and as I had diagnosed a calculus, I advised the owner to dispose of the horse. Being an honourable man, he preferred to keep him. On July 29, I was again called to treat the horse, and profiting from past experience, gave sedatives, linseed oil and enemata. There were intervals of several hours during this illness when the patient appeared normal and would eat. There were no very violent pains or character-

istic attitudes. He failed considerably on the fourth day and died on the fifth.

Post-mortem revealed a mixed clinker calculus situate in the large colon. It was made up of hair, solids and crystals, and weighed fifty-three ounces. I was unable to find the nucleus. To my knowledge this is the eighth Army horse which has died as the result of calculi since the Armistice. This is possibly due to the dirty methods of feeding which the services necessitated. The average time allowed for the formation of a calculus is a year. I would suggest that this took considerably longer as calculi are relatively rare in farm horses.

AN HISTORICAL ROARER.

By FREDERICK HOBDAI, F.R.C.V.S.,
London.

IN 1913, after the Olympia Show in London, a firm of Belgian horse dealers purchased a very fine-looking Irish hunter gelding, six years old, which had been entered in the jumping competition, but which was a bad roarer. It made such a noise, and seemed so distressed under the excitement of the show-ring, that it was not permitted to complete its exhibition. For this a sum of £65 was paid.

At their request I went over to Belgium and performed Williams' ventricle stripping operation on the throat, in consultation with a veterinary colleague there. The animal made an excellent recovery, and under the name of "National" won a good deal of money for his owner as a show jumper. In March, 1914, the horse was sold to a German buyer, who was purchasing for the Royal stables in Berlin, to which it was ultimately sold for £500, being purchased for Prince Eitel Fritz. I have been since informed that this horse was one of his favourite chargers during the late war.

Such was unwittingly my contribution to the German side!!!

IDIOSYNCRASY TO POTASSIUM IODIDE.

By P. MANUEL, M.R.C.V.S.
(*Crewe.*)

IN treating actinomycosis with potassium iodide I have, on several occasions, met with cases of individual susceptibility to the drug, and as I have not recently seen anything written upon this subject, I thought that, perhaps, the following instance, which recently came under my notice, was worth recording.

The patient was a valuable pedigree Hereford bull, two years old, weighing 18 cwt., with an actinomycotic growth under the lower jaw. Two drachms of potassium iodide were administered twice a day.

On the fifth day the animal had a profuse watery nasal discharge, with desquamation of the cuticle over the whole body, but very marked where the skin was fine around the eyes, ears, flank and scrotum. I then prescribed half a drachm twice a day, and even this had to be stopped for a few days, as it produced iodism. The drug had the desired effect, but during its course of administration I found that it could not be given continuously, and that it was wise to stop it for three or four days and then recommence. Eventually the bull made a good recovery. The smallness of the dose in comparison with the huge size and weight of the beast struck me as worth placing on record.

A LARGE INTESTINAL CALCULUS IN A HORSE.

By JOHN B. WOLSTENHOLME, F.R.C.V.S.,
Manchester.

A HEAVY draught gelding was sent to the knackers and destroyed on August 7 on account of age and being worn.

A smooth calculus weighing twenty-six pounds was found in the colon. I purchased the horse, in May 1909, for a large firm, the horse was then five years old; he has been under my supervision ever since. The horse has been very healthy, and *not* subject to colic.

The only peculiarity in his history was, that at intervals diarrhoea occurred from no known cause and the discharge was very foetid. Doubtless the irritation of the calculus would have induced the trouble.

THE PREVENTION OF "CUTTING."

By CAPT. J. R. HODGKINS, D.S.O., F.R.C.V.S.,
Royal Army Veterinary Corps, Secunderabad, India.

A HORSE belonging to a cavalry regiment was brought to hospital for persistent cutting. He had a wound on the inside of the near fore fetlock, the size of a florin. Treatment commenced.

Ingenuity was exhausted in the attempt to correct the condition by the classical surgical shoes.

The following simple device solved the difficulty. A strap, an inch wide, was made, lined with numdah, and fastening with a buckle. When at work this was worn strapped tightly above the fetlock of the wounded leg. The wound is healed, the horse at work in the riding school, than which no harder test could be imposed.

The idea is based on that of M. Delpérier, who "used gaiters extending from the upper part of the coronet to below the knee, and found that, by tightly lacing these, the action of the limb was somewhat limited and that marked abduction occurred." The strap does not make the animal go lame.

Reference.—"Horseshoeing and the Horse's Foot," Dollar and Wheatley, page 291.

General Articles.

THE INDIAN CIVIL VETERINARY DEPARTMENT: A RETROSPECT AND A WARNING.

By "ANGLO-INDIAN."

FOR some time past we have heard rumours that there has been in recent years a great deal of discontent amongst the officers of the Indian Civil Veterinary Department in regard to their pay, conditions of service, etc., and we are now in a position to examine the truth of these rumours and place the facts before our readers, particularly those who may be contemplating joining this department. When the department was first turned into a civilian department in 1902, the pay offered ranged from Rs. 500 to an Inspector-Generalship on Rs. 1,800 per mensem, which, as things were then, was a very fair, but by no means excessive remuneration.

In 1912, however, when the Government of India were looking for a means of retrenchment in their expenditure, the post of Inspector-General was abolished. It is not necessary to discuss here whether this post is a necessary one or not, but the officers of the department who joined previous to 1912 had looked upon it as a highly-paid post to which they might aspire, and when it was removed, without any word of compensation, they naturally complained bitterly, and memorialised the Government of India in the matter.

The reply they received was that their memorials would be dealt with by the Royal Commission which had been appointed in the meantime to consider the necessity for revising the pay and conditions of all the Indian services.

When the report of this Commission was published, in 1916, it was found that the restoration of the post of Inspector-General was not recommended, but as some compensation for its loss it was suggested that a senior officer in each province should be appointed Veterinary Adviser to each local Government with a suitable allowance.

The recommendations of the Commission had then to be dealt with by the Government of India, and since the beginning of 1919 revised scales of pay for the different Indian services have been appearing, ending with the I. C. V. D., whose new scale was not sanctioned until September of this year.

We have before us the revised pay of all the important uncovenanted Indian services, and in considering these we must bear in mind the fact that between the time when the Commission sat and the appearance of most of these new scales of pay, occurred the war, with all its attendant increases in the cost of living, and Mr. Montagu's Reform

Scheme, by which a great number of the services are placed under Indian control, became law.

The most striking feature of these revised scales of pay is the great similarity in them all, up to a certain point, *i.e.*, they all begin at about Rs. 500 p. m. and proceed by an annual increment of Rs. 50 to about Rs. 1,750 p. m. after 25 years' service.

After that, all the services, except the I. C. V. D., contain administrative posts on pay varying from Rs. 2,000 to Rs. 3,000 p. m., to which their most successful officers will be appointed. We believe that in every service so far considered, other than the I. C. V. D., the initial pay has been raised. In 1902 the initial pay of an officer in the I. C. V. D. was Rs. 500 p. m. It is the same to-day under the revised (*sic*) scale of pay.

It was said that Rs. 500 p. m. was offered when the civilian department was first formed in order to attract sound and experienced members of the profession. If the converse is now required, the wishes of the Government of India should be easily complied with. A subaltern in the R.A.V.C. in India to-day draws Rs. 550 p. m., while one in the Indian Medical Service is given Rs. 650.

Under the new rules, officers of the I. C. V. S. will proceed by annual increments to Rs. 1,500 p. m., which they will reach in their twenty-first year of service, and after that 15 per cent. of them may be appointed to a selection grade which rises to Rs. 1,750 p. m.

As regards the recommendation of the Public Services Commission, that an Adviser to Government should be appointed in each province with a suitable allowance, the Government of India have fixed the allowance at Rs. 150 p. m., for officers who are appointed to the post when they have less than 15 years' service, which we imagine will be very seldom. Officers of more than 15 years' service who are appointed to these posts will be placed in the selection grade and will draw no allowance. In other words, an officer in the I. C. V. D. now cannot draw a pay of more than Rs. 1,750 p. m., which is Rs. 50 a month less than was possible to him previous to 1912, and at least Rs. 500 a month less than the pay which will be drawn by the heads of the other departments in the country.

We note that private practice, for which the department has been asking for some time past in order to remove the stigma attaching to its prohibition when other officials in India are permitted to take it, is granted under certain conditions, but we understand that the concession is a negligible one from a monetary point of view, except in one or two large towns like Bombay and Calcutta. We consider that very little further comment is necessary. We have never heard of a worse case of ingratitude on the part of any employer than this.

The members of this department have had a great deal of pioneer work to do in setting up an efficient veterinary service in India, and, as will have been gathered from the reports from the different provinces in India which are reviewed in the English journals from time to time, the work has always been done with an inadequate European staff. We would strongly warn members of the profession from taking service under the Government of India while conditions remain as we have described them.

SOME OF THE SEQUELÆ OF NEURECTOMY.

BY THE LATE CAPT. ARTHUR ROUTLEDGE, F.R.C.V.S.

(*Louth.*)

HAVING the idea that the attendant risks of neurectomy are probably rather over, than under, estimated, I purpose dealing with a number of cases giving statistics relative to length of useful service, complications, and post-mortems, of subjects of the more commonly performed operations.

The cases still at work will be dealt with from date of operation to December 31, 1902 ; but for brevity's sake, dates of the other operations will be omitted, except in a few cases where the dates are deemed helpful.

The horses have all been at trotting work—the major proportion in double harness—neurectomy being resorted to in almost every case after the failure of other treatment to restore the horses to a degree of workable soundness ; and in a few instances in lieu of the friendly poleaxe.

PREPARATION OF SUBJECT FOR OPERATION.

1. Withholding food and water for about 8 hours.
2. Clipping hair as short as possible from the field of operation ; scrubbing the parts thoroughly with Izal soft soap and water, containing creolin ; a bandage being applied where possible.
3. For the plantar operation limb rendered bloodless by Esmarch bandage and tourniquet.
4. All instruments, sutures, etc., boiled, immersed in 1-40 carbolic solution. Hartmann's wood wool used to mop up blood ; 1-500 chinolol solution used for operation wounds—with iodoform in addition for the median cases.
5. Horses cast on straw, chloroform administered by a Roalfe Cox muzzle, the quantity used being from 1½ oz. to 4 oz.—without cause for anxiety—the patients, with a few exceptions, going steadily under and being on their legs in from 5 to 15 minutes after completion of the operation.

I have no intention of entering into the *modus operandi* of the various cases, but have found by employing the above precautions that the plantar and posterior tibial wounds have usually healed by first intention, occasionally the ulnars, but a varying degree of supuration has been the rule with the median wounds.

Diagnosis when attempted is entered and confirmed or otherwise by *post-mortem* examination where possible.

In some of the obscure cases valuable assistance in attempting to localise the cause of lameness has been obtained by an injection of 10 per cent. solution of cocaine.

All the horses kept shod in leathers to minimise the risk of picking up foreign bodies, and with the same object in view, indiscriminate paring and reduction of feet prohibited.

In some of the old standing cases, particularly of the plantar operations, there is a tendency to wear the heels of the shoes out, the gait being closely allied to that of some forms of chronic laminitis; we have found considerable improvement to follow lowering of the horn at the heels, thinning the heels of the shoes and setting them slightly "on the roll."

The patients have from time to time been inspected and, except where otherwise stated, have not lost any working time from cause attributable to the subject matter of this paper.

Selection of subjects for operation leads to disappointments and surprises, the apparently "good subject" often breaking down early, while the "forlorn hope" may work on for years. We hope to prove that "laminitis" and those affected with corns are, above all others, bad subjects.

No. 1. *Brown mare.* Diagnosis: Navicular disease. Plantar both fore. Cast worn out. 434 days' case.

No. 2. *Cart horse.* Diagnosis: Navicular disease. Plantar both fore. December 21, 1899, January 20, 1900. Lamé near fore after doing a few miles work. Resumed work February 4; continued till June 22. Killed. *Post-mortem*: Ulceration of wings of pedal bones, roughening of posterior surfaces. Exostoses both ossa coronæ. Old standing fracture of upper articular surface near os corona.

143 days' case.

No. 3. *Bay mare.* Diagnosis: Navicular disease. Plantar near fore. January 31, 1900, August 20, 1900. Lamé near fore; corn; removed dead laminæ and fractured wing of pedal bone. Progressively worse. Killed. *Post-mortem*: Large sidebone inside heel, fractured and loose in tissues. Extensive ulceration, large bony growth upper edge of the navicular bone. 226 days' case.

No. 4 *Bay mare.* Diagnosis: Navicular disease. Plantar both

fore. February 7, 1900. Lamé off fore during December ; fissure in outside heel between sole and wall ; removed a portion of necrotic laminæ and sole. Under treatment about a month, and resumed usual work. Cast slow and worn out. 603 days' case.

No. 5. Bay horse. Diagnosis : Ringbones. Plantar both fore. February 7, 1900. September 9, 1901. Lamé at a trot, pain on pressure over nerve endings, which are much enlarged. Cast.

582 days' case.

No. 6. Grey horse. Diagnosis : Navicular disease. Plantar both fore. Became affected with megrims during hot weather. Cast.

541 days' case.

No. 7. Bay horse. Diagnosis : Navicular disease. Plantar both fore. Cast worn out. 880 days' case.

No. 8. Dun horse. Diagnosis : Navicular disease. Plantar both fore. Still at work. 1,027 days' case.

No. 9. Roan mare. Diagnosis : Navicular disease. Plantar both fore. March 22, 1900. March 31, off fore leg swollen, a little pus from operation wounds. Coronet burst at toe ; progressively worse. Killed April 15. *Post-mortem* : Fracture of os pedis. Slight navicular disease. This mare, on removal of chloroform muzzle, became much excited and scrambled on to her legs. I think she must have fractured her pedal bone then as the degree of lameness prior to operation was inconsistent with the *p.-m.* appearances.

No. 10. Bay mare. Diagnosis : Ringbones. Plantar both fore. Still at work 1,007 days' case.

No. 11. Bay horse. Diagnosis : Navicular disease. Plantar both fore, April 11, 1900. October 13, 1901 : Lamé both fore ; soles under-run with pus, especially near fore, in which the toe of pedal bone is exposed and necrotic. Killed. *Post-mortem* : Discolouration and roughening of navicular bones, necrosis of laminæ and solar edges pedal bones. 552 days' case.

No. 12. Bay mare. Diagnosis ; ? Plantar both fore. Through a fall became permanently lame Near hind cast. 652 days' case.

No. 13. Brown horse. Diagnosis : Chronic foot lameness. Plantar both fore, May 9, 1900. September 20 : While being shod farrier discovered sole of the off fore foot to be " dropped " ; much under-run with pus. Killed. *Post-mortem* : Effusive laminitis, descent of pedal bone. 142 days' case.

No. 14. Bay mare. Diagnosis : Navicular disease. Plantar both fore. Killed. Result of open joint through tread. No *post-mortem*. 167 days' case.

No. 15. Bay mare. Diagnosis : ? Plantar both fore, May 17, 1900. September 1 : Lamé, suppurating corn, which eventually

burst through the coronet. Killed. *Post-mortem*: Gangrene of laminæ in region of inner heel. Periostitis wing of the pedal bone.

113 days' case.

No. 16. *Cart horse*. Diagnosis: Ringbone. Plantar near fore. Cast worn out and lame.

721 days' case.

No. 17. *Grey mare*. During February, 1900, performed partial cartilage operation for quittor and though the foot made a splendid recovery she became permanently lame, after doing 10 days' work. Plantar near fore. May 31: Resumed work and fell lame off fore. Plantar off fore, September 26. May 25, 1901: Lame off fore; suppurating corn burst through the coronet when admitted to infirmary. Work, July 12. October 14, 1901: Lame near fore, farrier has inadvertently driven a nail into false quarter, a relic of quittor operation, causing suppuration. Resumed work 29th inst. December 16: Suppurating corn near fore. Work, 25th. From this date has been no further trouble. Still at work.

944 days' case.

No. 18. *Brown horse*. Diagnosis: ? *History*:—Intermittent lameness of six months; supposed to have "picked up a stone." With treatment became sufficiently sound on three occasions to do a few days' work; then fell most acutely lame again. Horse stands level, walks lame, trots dead lame, as though suppuration was taking place; foot large, sole inclined to be flat, with slight discolouration round the point of the frog; pain on percussion. Leg "clean." Plantar off fore. May 31, 1900. Still at work.

944 days' case.

No. 19. *Bay mare*. Diagnosis: Navicular disease. Plantar both fore: Still at work.

944 days' case.

No. 20. *Black horse*. Diagnosis: Navicular disease. Plantar both fore. May 31, 1900. November 22: Lame both fore, pain on pressure over operation wounds. Both coronets very sensitive to pin prick. Median both fore, 24th inst. After doing a few miles' work the gait resembled sub-acute laminitis; disappeared with rest. Cast unfit for trotting.

224 days' case.

No. 21. *Brown horse*. Diagnosis: Navicular disease. Plantar both fore. Became affected with grease. Cast.

322 days' case.

No. 22. *Bay horse*. Diagnosis: Ringbone. Plantar off fore. Died of contagious pneumonia. *Post-mortem*: Old standing fracture of upper articular surface os suffraginis. Exostoses anterior surface of bone, and of the os corona.

582 days' case.

No. 23. *Brown mare*. Diagnosis: Navicular disease. Plantar both fore. June 26, 1900. Eczema, off fore heel, commenced to lick affected part, killing skin for about extent of palm of hand. While under-treatment, died of torsion of small intestine.

64 days' case.

No. 24. *Bay mare*. Diagnosis: Pedal ostitis. Plantar both fore.

July 26, 1900. September 3, After completing day's work had the appearance of an acute attack of laminitis. Killed. *Post-mortem* : Chronic inflammation of pedal bones ; solar surfaces studded with pin head elevations. Navicular bones healthy. 44 days' case.

No. 25. *Black horse*. Diagnosis : Navicular disease. Plantar both fore, August 29, 1900. March 26, 1901 : Lamé near fore, limb swollen, toe turning up, hollow of heel, full. Killed. *Post-mortem* : Navicular fractured, slightly diseased ; perforans tendon partially ruptured where it passes over the fractured bone. 220 days' case.

No. 26. *Roan mare*. *History* :—Under treatment six months for supposed shoulder lameness near fore ; toe slightly dragged in trotting, the lameness, instead of abating, became very acute. One day, when sentence of death was about to be passed, to my utter surprise, the mare pulled out lame off fore. Plantar both fore (after an injection of cocaine, which made the mare trot soundly in 5 minutes). September 6, 1900 : Contracted permanent sesamoid lameness near hind. Posterior tibiæ, March 27, 1901. No further trouble. Cast worn out, May 25, 1902. 630 days' case.

No. 27. *Black mare*. Diagnosis : ? Plantar both fore. September 6, 1900. March 26, 1901 : Lamé off fore ; bony deposit round front of pastern. Much improved by rest. Cast unfit for trotting. 210 days' case.

No. 28. *Bay horse*. Diagnosis : Navicular disease. Median off fore. September 22, 1900. April 10, 1901 : Lamé, did not respond to treatment. External plantar. Still at work. 830 days' case.

No. 29. *Bay horse*. Diagnosis : Navicular disease. Plantar both fore. November 10, 1900. June 6, 1901. Lamé near fore. Spr. subcarpal ligament. Median and ulna 8th inst. October 1, a piece of skin size of 5s. piece gnawed from site of inner plantar wound. Tied head up short and wound commenced to heal, but horse kept up the irritation by rubbing sore with other foot. Killed. *Post-mortem* : Discolouration and slight roughening of navicular bones. Exostosis upper edge of near bone. 333 days' case.

No. 30. *Brown mare*. Diagnosis : Sidebones. Plantar both fore. One day, while at work, mare commenced to bleed from the off coronet. Hoof separated from coronary band for about two inches. A probe could be passed down laminæ to the toe. Sole under-run with pus. Killed. *Post-mortem* : Hoof changes seemed to be due to laminitis necrosis of laminæ and toe of pedal bone. 242 days' case.

No. 31. *Black mare*. Diagnosis : ? Median off fore. Still at work. 770 days' case.

No. 32. *Cart mare*. Diagnosis : Navicular disease. Plantar both fore. Still at work. 781 days' case.

No. 33. *Bay mare*. Diagnosis : Ringbones. Plantar both fore. Bony deposits increased in size ; mare had to have a few days' rest from time to time. Cast unfit for trotting. 274 days' case.

No. 34. *Bay mare*. Diagnosis : Navicular disease. Median off fore. Pricked in shoeing. Killed. *Post-mortem* : Removed horn from outer quarter, found a necrotic plate of laminal surface of pedal bone. Well-marked navicular disease. 91 days' case.

No. 35. *Bay mare*. Diagnosis : Navicular disease. Plantar both fore. December 31, 1900. April, 1901 : Inveterate "stumbler." cast. 158 days' case.

No. 36. *Cart mare*. *History* : Periodically lame off fore, hoof much contracted, well-marked rings at heels. Leg free from disease. Plantar off fore. December 11, 1900. May, 1902. Lame, diffused bony growth pastern. Sound at work. Cast. 520 days' case.

No. 37. *Bay horse*. Diagnosis : Ringbone. Median near fore. Died azoturia away from home ; no *post-mortem*. 615 days' case.

No. 38. *Bay horse*. Diagnosis : Ringbone. Median off fore. Became confirmed crib biter ; very thin and subject of colic in consequence. Cast. 618 days' case.

No. 39. *Bay mare*. Diagnosis : Ostitis fetlock. Median off fore. Still at work. 749 days' case.

No. 40. *Roan mare*. Diagnosis : Ostitis fetlock. Median near fore. Still at work. 725 days' case.

No. 41. *Cart horse*. Diagnosis : Ostitis fetlock. Median near fore. January 19, 1901. Lame from same condition. Median off fore. May 1, 1901 : Still at work. 711 days' case.

No. 42. *Bay mare*. Diagnosis : Navicular disease. Plantar both fore. January 19, 1901. May 25, 1901 : Suppurating corn burst through coronet. Work June 10. No further trouble with foot. Died pleurisy. *Post-mortem* : Navicular bones diseased. 259 days' case.

No. 43. *Bay horse*. Diagnosis : ? Plantar both fore. January 19, 1901. April, 1902 : Bad corn each foot. Cast. 103 days' case.

No. 44. *Bay mare*. Diagnosis : ? *History* : Lame from time to time, no assignable cause. Median off fore, January 20, 1901. Killed September 20, 1902. *Post-mortem* : Large slough of coronary band inside heel, wing of pedal bone necrotic, abscess containing about 2 oz. pus behind the lateral cartilage. Navicular bone diseased. 607 days' case.

No. 45. *Bay mare*. Diagnosis : Navicular disease. Plantar both fore. Cast for " bent fore legs." 598 days' case.

No. 46. *Cart horse*. Diagnosis : ? Median near fore. Cast for " bent fore legs." 172 days' case.

No. 47. *Bay mare.* Diagnosis: Navicular disease. Plantar off fore. While at work fell most violently lame; had to be "ambulanced" home. Killed. *Post-mortem*: Flexor perforans tendon at level of pastern ruptured. Well-marked navicular disease. 660 days' case.

No. 48. *Black mare.* *History*: While under treatment for canker near hind developed lameness off fore. Median off fore. January 20, 1901. Canker broke out again. Cast. 116 days' case.

No. 49. *Cart mare.* Diagnosis: Navicular disease. Plantar near fore. Cast for "bent fore legs." 335 days' case.

No. 50. *Bay mare.* Diagnosis: Ostitis fetlock. Median near fore. Still at work. 697 days' case.

No. 51. *Roan mare.* Diagnosis: Chronic sprain of flexor tendons, and navicular disease. *History*: Fired and blistered three months ago. Present symptoms are, chronic thickening of tendons, no pain on pressure, lameness most marked off fore (the foot continually rested). Median both fore. Ulna off fore. February 9, 1901. July 2: Lame off fore; coronet bulging round toe. Similar case and *post-mortem* to No. 30. 143 days' case.

No. 52. *Roan horse.* Diagnosis: Sprained flexor tendons. Median February 9, 1901. Became sound and fell lame at exercise. Ulna, March 12. April 6, 1902: Subject of a severe attack of colic, injured the off fetlock joint. From this date onwards, if allowed, would "gnaw" joint and inside of leg. Cast. 529 days' case.

No. 53. *Cart horse.* Diagnosis: Navicular disease. Plantar off fore. Still at work. 690 days' case.

No. 54. *Bay mare.* *History*: Very severe cracked heel off hind; when recovered was lame off fore. Sound after cocaine injection over plantar nerves. Probably navicular disease. Plantar off fore. February 15, 1901. January 18, 1902: Suppurating corn off fore, removed necrotic wing of pedal bone. 20th: Suppurating corn near fore. Resumed work February 19, but continued to be lame at times near fore. Cast. 552 days' case.

No. 55. *Black horse.* Diagnosis: Ostitis fetlocks. Median both fore. February 15, 1901. After a few days' work fell lame off fore. Ulna. March 3. June, 1902: Has contracted a habit when in the stable of rubbing the off fore foot up and down the near fore, causing the in contact horn to be quite smooth. Still at work. 685 days' case.

No. 56. *Grey mare.* Diagnosis: Chronic sprained flexor tendons. Median both fore. February 16, 1901. March 20, 1901: Lame again off fore, Ulna. 23rd inst. Still at work. 685 days' case.

No. 57. *Black horse.* Diagnosis: Navicular disease. Plantar both fore. March 2, 1901. September 28, 1901: Lame near fore, no apparent cause. The head of the os corona off fore shows a bony

deposit about the size of a walnut ; strong ridge of horn running down the centre of foot from coronet to toe. Cast, unfit for trotting.

251 days' case.

No. 58. *Black mare*. Diagnosis : Chronic sp. flexor tendons. Median off fore. March 2, 1901. This mare was most difficult to chloroform, and continued, in spite of the administration of 6 oz. chloroform, in a state of excitement, doing an imaginative broadside gallop during the whole operation. Severed the posterior radial artery in mistake for median nerve. Applied tourniquet with difficulty above operation wound, and completed operation, tightly suturing wound up. There was great subsequent swelling of limb and loss of the power of extension, toe being dragged along the ground in walking. Resumed work April 1. Still at work. 669 days' case.

No. 59. *Grey mare*. Diagnosis : Navicular disease. Plantar near fore. March 12, 1901. Still at work. 659 days' case.

No. 60. *Black mare*. Diagnosis : Ostitis fetlock ? Fairly well marked diffuse swelling over the inner head of os suffraginis. Mare continually points. Plantar off fore. March 12, 1901. July 7. Badly "pricked." Killed. *Post-mortem* : Sole from outside quarter to toe much under-run with pus, laminæ and sensitive sole of jelly-like consistency, edge of pedal bone necrotic. No evidence of disease of the os suffraginis. 114 days' case.

A comparison of the 60 consecutive cases gives :—

Average work : 1 year, 16 weeks, 4 days.

SALES :—

- | | | | |
|----|----------------------------------|-------------------|--------------|
| 1. | 10 in connection with neurectomy | 1 year. | average life |
| 2. | 13 for other causes | 1 year, 15 weeks. | „ „ |

23 sales. Average life 1 year, 10 weeks.

KILLED :—

- | | | | |
|----|----------------------------------|----------|---------------|
| 1. | 16 in connection with neurectomy | 34 weeks | average life. |
|----|----------------------------------|----------|---------------|

DIED :—

- | | | | |
|----|--------------------------------|-----------------|-----|
| 1. | 4 Causes other than neurectomy | 1 year, 2 weeks | „ „ |
|----|--------------------------------|-----------------|-----|

STILL WORKING :—

- | | | |
|----|--------------------------|---------------------------|
| 1. | 17 cases. Average life : | 2 years, 9 weeks, 2 days. |
|----|--------------------------|---------------------------|

The following are the conclusions :—

1. The close degree of gravity from subsequent serious sequelæ existing between the plantar, and median and ulna, operations.
2. The slight risk following the median operation ; as no horses were cast or killed for causes attributable in any way to the operation.
3. That unnerved horses can, and do have, serious foot troubles, calculate d to cause anxiety in feet, and yet make useful recovery.

4. That the most serious cause of failure occurred where the horse had had laminitis ; five having to be killed for that disease, with the low average life of 32 weeks. Therefore in the selection of subjects for operation, those having any suggestion of laminitis should above all others be avoided.

SUMMARY OF 60 CONSECUTIVE OPERATIONS

No.	Operation.	Days Worked.	Result.
1	Plantar both fore ...	434	Cast. Worn out.
2	" " " ...	143	Killed. <i>Post-mortem</i> : Ringbone.
3	" near fore ...	226	Killed. <i>Post-mortem</i> : Fractured pedal bone.
4	" both fore ...	603	Cast. Worn out.
5	" " " ...	582	Cast. Neuroma.
6	" " " ...	541	Cast. Megrimis.
7	" " " ...	880	Cast. Worn out.
8	" " " ...	1027	Still working.
9	" " " ...	Nil.	Killed. <i>Post-mortem</i> : Fractured pedal bone.
10	" " " ...	1007	Still working.
11	" " " ...	552	Killed. <i>Post-mortem</i> : Laminitis.
12	" " " ...	652	Cast. Lane near hind.
13	" " " ...	142	Killed. <i>Post-mortem</i> : Laminitis.
14	" " " ...	167	Killed. (Tread). No <i>post-mortem</i> .
15	" " " ...	113	Killed. Corn.
16	" near fore ...	721	Cast. Tendon trouble.
17	" both fore ...	944	Still working.
18	" off fore ...	944	Still working.
19	" both fore ...	944	Still working.
20	Median " " ...	224	Cast. Tendon trouble.
21	Plantar both fore ...	322	Cast. Grease.
22	" off fore ...	582	Died of contagious pneumonia.
23	" both fore ...	64	Died. Twisted small intestine.
24	" " " ...	44	Killed. <i>Post-mortem</i> : Laminitis.
25	" " " ...	220	Killed. <i>Post-mortem</i> : Fractured navicular.
26	Post tibial, near hind.	630	Cast. Worn out.
27	Plantar both fore ...	210	Cast. Ringbone.
	Median off fore ...		
28	Ext. plantar ...	830	Still working.
	Plantar both fore ...		
29	Median and Ulna near— fore ...	333	Killed. Gnawed leg.
30	Plantar both fore ...	242	Killed. Laminitis.
31	Median off fore ...	770	Still working.
32	Plantar both fore ...	781	Still working.
33	" " " ...	274	Cast. Ringbone.
34	Median off fore ...	91	Killed. Pricked.
35	Plantar both fore ...	158	Cast. Stumbling.
36	" off fore ...	520	Cast. Ringbone.
37	Median near fore ...	615	Died. Azoturia.
38	" off fore ...	618	Cast. Crib-biter.
39	" " " ...	749	Still working.
40	" near fore ...	725	Still working.
41	" both fore ...	711	Still working.
42	Plantar both fore ...	259	Died. Pleurisy.
43	" " " ...	103	Cast. Corns.
44	Median off fore ...	607	Killed. Slough.
45	Plantar both fore ...	598	Cast. Bent legs.
46	Median near fore ...	172	Cast. Bent legs.
47	Plantar off fore ...	660	Killed. Ruptured tendon.

No.	Operation.	Days Worked.	Result
48	Median off fore ...	116	Cast. Canker near hind foot.
49	Plantar near fore ...	335	Cast. Bent legs.
50	Median near fore ...	697	Still working.
	Ulna off fore ...		
51	Median both fore ...	143	Killed. <i>Post-mortem</i> : Laminitis.
52	Median and ulna off fore	529	Cast. Gnawed leg.
53	Plantar off fore ...	690	Still working.
54	" " " ...	552	Cast. Corn near fore.
	Median both fore ...		
55	Ulna off fore ...	685	Still working.
	Median both fore ...		
56	Ulna off fore ...	685	Still working.
57	Plantar both fore ...	251	Cast. Ringbone
58	Median off fore ...	669	Still working.
59	Plantar near fore ...	659	Still working.
60	" off fore ...	114	Killed. Pricked.

Abstracts.

LOSS OF ANIMALS IN THE WAR.

It will be of interest to cavalry officers and others who had charge of animals during the war to know that the losses are the smallest percentage recorded for any campaign. This speaks well for the horsemastership when it is remembered that many men had charge of animals who had never done so before. Four hundred and eighty-four thousand, one hundred and forty-three animals lost their lives, including 5,589 lost at sea through enemy action. This works out at less than 15 per cent. per year of the total number of animals on service. This is an extraordinarily low percentage when we think what they had to go through. Camels were the chief offenders in dying. In Mesopotamia, in the last year of the war, 86.52 per cent. of the camels on service died. We do not know whether this return includes the loss of animals prior to being sent overseas. If not, it would be of interest to know the loss at the depots at home and abroad.

As regards the loss of camels in Mesopotamia, they are very different from horses, and require special knowledge to keep them fit and well. We know that many of the officers and men had never seen a camel before, except, perhaps, at the Zoo, which accounts, in all probability, for the high percentage of deaths. The campaign in Mesopotamia was what we may call a side show to the events that were happening elsewhere. If it had not been, more people would realise the hard work, the bad climate, and the hard fighting our troops had to overcome. It is the only place, except Palestine, where we have heard of trenches being charged by cavalry with success. This report speaks well for our Veterinary Department, a department that does a lot of hard work and is very seldom mentioned or thought of except by people in touch with it, who fully appreciate its work.—(From Editorial Sporting Notes, *Cavalry Journal*.)

ABSTRACT FROM THE REPORT OF THE COMMITTEE APPOINTED BY THE SECRETARY OF STATE FOR THE COLONIES TO CONSIDER THE STAFFING OF THE VETERINARY DEPARTMENTS IN THE COLONIES AND PROTECTORATES.

(Continued from last Issue.)

A complete Report can be obtained at H.M. Stationery Office, Kingsway W.C. Price 2d.

APPENDIX SHOWING PRESENT STAFFS AND SALARIES.

EAST AFRICA PROTECTORATE.

<i>Staff.</i>	<i>Present Salary.</i>
1 Chief Veterinary Officer ...	£600—£25—£700+£60 duty pay (+ war bonus).
1 Deputy Chief Veterinary Officer.	£500—£20—£600+£50 duty pay (+ war bonus).
14 Veterinary Officers ...	£400—£20—£500 (+ war bonus).
1 Veterinary Pathologist ...	£500—£25—£600+£50 duty pay (+ war bonus).
1 Assistant to „ ...	£400—£20—£500 (+ war bonus).
1 Senior Research Officer ...	£500—£25—£700 (+ war bonus).
1 Junior „ ...	£400—£25—£500 (+ war bonus).
19 Stock Inspectors ...	£200—£15—£245 (+ war bonus).
1 Laboratory Superintendent ...	£300—£15—£400 (+ war bonus).
2 European Laboratory Assistants	£200—£10—£250 (+ war bonus).
2 „ „ „	£160—£10—£180 (+ war bonus).
2 Lay Field Assistants ...	£180—£10—£200 (+ war bonus).
1 Registrar of Brands ...	£200 (+ war bonus).
1 Permit Officer ...	£300 (+ war bonus).

Veterinary Establishments.

Uganda.

<i>Staff.</i>	<i>Present Salary.</i>
1 Chief Veterinary Officer ...	£500—£25—£600+£50 duty pay (+ war bonus).
4 Veterinary Officers ...	£400—£20—£500 (+ war bonus).
3 Stock Inspectors... ..	£200—£10—£250 (+ war bonus).

N.B.—For special measures against rinderpest and pleuro-pneumonia a temporary addition of 6 Veterinary Officers and 18 Stock Inspectors is contemplated.

Zanzibar.

1 Veterinary Officer(Non-European) Rs. 1,800—Rs. 120—Rs. 2,400.

Nyasaland.

1 Chief Veterinary Officer ...	£500—£25—£600+£50 duty pay (+ war bonus).
2 Veterinary Officers ...	£400—£20—£500 (+ war bonus).

[N.B.—War Bonus is at the following rates :—

<i>Salary.</i>	<i>If Married.</i>	<i>If Unmarried.</i>
Up to £199	£120 ...	£70
£200 „ £299	£115 ...	£65
£300 „ £399	£110 ...	£60
£400 „ £499	£105	£55
£500 „ £599	£100 ...	£50
£600 „ £699	£95 ...	£45
£700 and upwards	£90 ...	£40]

Gold Coast.

1 Veterinary Officer	£450 + £90 duty pay. War bonus £120 a year.
-----------------------------	---

Sierra Leone and the Gambia.

No Veterinary Officers.

VETERINARY APPOINTMENTS IN CEYLON.
(Taken from Ceylon Estimates 1919-1920.)

<i>Name of Post.</i>	<i>Salary.</i>
1 Government Veterinary Surgeon ...	Rs. 5,625—Rs. 281·25—Rs. 7,875.
4 Assistant Veterinary Surgeons... ..	Rs. 3,000.
20 Stock Inspectors (Singhalese and Indian).	Rs. 540 to Rs. 1,800.
These salaries have a temporary bonus as follows :—	
Under Rs. 4,500	20 per cent.
Under Rs. 7,500	£90 per annum.
Under Rs. 11,250	£80 per annum.

VETERINARY APPOINTMENTS IN MAURITIUS.

- 1 Veterinary Surgeon Rs. 6,000.
A temporary allocation of 20 per cent. is being made on this salary.

VETERINARY APPOINTMENTS HELD BY EUROPEANS IN STRAITS SETTLEMENTS
AND FEDERATED MALAY STATES

(a) *Straits Settlements.*

Three Veterinary Surgeons with salary at \$350—15A—\$650 per month, with and Efficiency Bar at \$600 (= £490—21A—£910 per annum, with Efficiency Bar at £700).

(b) *Federated Malay States.*

Five Veterinary Surgeons with salary as above.

MINIMUM VETERINARY FEES IN BERLIN.

At a time like the present, when the question of fees and finance is urgently before us in England, it is interesting to note what the Veterinary Association in Berlin has published on the same subject.

The following rates may be increased, but not diminished; they are the *minimum* rate of fees which has been agreed upon :—

	Marks.
1. Consultation by telephone	3
„ by letter	6
„ at home	5
2. Visit by day to one animal	10
For each subsequent one on the same occasion ..	3
Evening visit (7 p.m. to 10 p.m.)	15
Night visit (10 p.m. to 8 a.m.)	20
(Exclusive of the cost of transport).	
Visit on fete days (8 a.m. to 1 p.m.)	15
„ „ (1 p.m. to 11 p.m.)	20
Urgent visit, or at an appointed time, 50 per cent. more.	
3. Additional Charges :—	
Bandage	3
Subcutaneous injection	3
Intra-venous or intra tracheal	6
Injection Enema of a large quantity of fluid ..	20
Rasping teeth	10
Slight operation (abscess lancing, etc., suturing wound)	5
Major operation (without casting)	30
„ (if necessary to cast)	50
Removal of afterbirth	20

Parturition, depending upon the mal-presentation and the value of the animal	20
4. Various fees :—	
Visit with short certificate (rabies, etc.)	10
An ordinary certificate	10
Special certificate in detail	30
Post-mortem of fowls or rabbits (each one)	5
„ goat	10
„ larger animals	20
Short written report (additional)	5
Full, written post-mortem certificate (first case)	20
„ If any others, for each	10
Opinion as to purchase (first animal)	20
„ If any others, for each	10
If purchased, in addition, 1 per cent. of the price paid, exclusive of the visiting fee.	
An ordinary microscopical examination	5
Report of same	5
Research of ordinary difficulty	20

Review.

VETERINARY DOSES AND PRESCRIPTION WRITING. By PIERRE A. FISH, D.Sc., D.V.M., Professor of Veterinary Physiology, New York State Veterinary College, Cornell University. Fifth Edition. Price \$1 50 cents. Published by Cornstock Publishing Co., Ithaca, New York.

THIS is a handy little book of 176 pages, bound in a serviceable flexible cover. That it has gone into five editions is sufficient evidence as to its utility and value. It contains a very full list of drugs and their doses, and we are glad to see hypodermic medication referred to in the following words :—"Hypodermics of alkaloids are given usually at *one half* the dose by mouth." Hypodermic injections as therapeutic remedies are frequently overlooked in our pharmacopœia handbooks. By the bye, we know of one or two text-books that give the subcutaneous dose at one-tenth of the oral dose. Surely it is time that hypodermic medication and local anæsthesia had a few plain and simple lines to themselves in all posological text-books. There is a pretty full list of drugs which when given by the mouth are excreted by the mammary gland, but formalin does not appear. It is a notable omission, especially as the fact of its elimination in the milk, when given orally, has made it a first-rate remedy in the treatment of mammitis. It is interesting to note that the duration of pregnancy in the camel is given as forty-five weeks, the zebra thirteen months, and the elephant twenty-four months. Can any of our foreign members explain why the zebra retains its young longer than the mare, or why it takes the fœtus longer to reach

maturity? There are eight useful little pages of examples of incompatibility in prescriptions. The danger of mixing liq. ferri chlor., pot. chlor. and glycerine is noted. A commoner danger, and one that is liable to occur in a busy practice where pupils may abound, arises from the pounding together of pot. chlor. and flowers of sulphur. Quite an acceptable little section of the book deals with "therapeutic terms" and "terminations of medical terms."

The volume is a reliable and complete guide for the veterinarian and student, and we have no doubt that the fifth edition will soon be exhausted. G. M.

PETITION FROM THE MEMBERS OF THE INDIAN CIVIL
VETERINARY DEPARTMENT TO THE SECRETARY
OF STATE FOR INDIA.

To

THE RIGHT HONOURABLE

MR. E. S. MONTAGUE, M.P.,

His Majesty's Secretary of State for India.

The Humble Memorial of.....
....., a member of
the Indian Civil Veterinary Department.

RESPECTFULLY SHEWETH:—

1. Your memorialist requests your consideration of the revised scale of pay and emoluments of the Indian Civil Veterinary Department as laid down in the advertisement in the *Veterinary Record* of 12th June, 1920, a true copy of which is attached.

2. Your memorialist humbly begs to draw your attention to the disproportion between the amount of the benefit in his case and the magnitude of the condition, to wit the general increase in the cost of living, which it is intended to remedy.

In the case of your memorialist who has years seniority the net gain only amounts to Rs. per month a percentage of as opposed to an all round increase in the cost of commodities of at least 150 per cent.

3. Your memorialist also begs to draw your attention to the permission to practise privately.

Such permission is conditional, and can only apply to a minority of officers of the Department—in any case it is a concession of negligible value.

4. It was thought by your memorialist that he would not be sent out to take up the duties and responsibilities of an officer of the Indian Civil Veterinary Department without at least receiving a living wage,

but while in India he has found his salary on the present scale of pay wholly inadequate.

However, an increase commensurate with the present day cost of living was patiently hoped for on the revision of the scale of pay of the Department.

5. Your memorialist is regretfully compelled to recognise that the revised scale of pay as represented in the accompanying advertisement contains no real amelioration of his case.

6. As your memorialist's present existence under a burden of financial difficulties is so harassing, he humbly prays that you will recommend to the proper authority—

- (a) That in the revised scale of pay the commencing salary of officers of the Department should be Rs. 650/- a month rising by annual increment of Rs. 100/- a month to Rs. 2,500/- a month.
- (b) That pending decision on the above points, your memorialist should receive an immediate allowance of Rs. 250/- a month, dating back to the time of his landing in India as some relief to his present distress.

7. That in the event of it being found impossible to concede this further revision of the scale of pay, your memorialist humbly prays.

- (a) That the refund of the outward passage money be fore-gone.
- (b) That a first-class return passage be provided.
- (c) That a sum of money equivalent to three months' salary be granted as some solatium for time wasted and opportunities lost in the selection of a career.

Confidently trusting in your sympathetic consideration for the welfare of the loyal servants of His Majesty's Government, your memorialist as in duty bound, will ever pray.

Your most humble
and
obedient servant,

Dated 12th August, 1920.

Copy from page 11 of "Veterinary Record" of 12th June, 1920.

INDIAN CIVIL VETERINARY DEPARTMENT.

THE Secretary of State for India proposes to make one or more appointments to the Indian Civil Veterinary Department this summer if so many *qualified candidates* are available.

Preference will be given to candidates who served in His Majesty's Forces. Candidates must possess a diploma from the Royal College of Veterinary Surgeons, evidence of a knowledge of bacteriology and of

capacity for carrying out original research will be specially taken into account in estimating the claims of candidates.

Pay Rs. 500/- a month rising by annual increments of Rs. 50/- a month to Rs. 1,500/- a month, with selection posts on Rs. 1,500/- a month rising to Rs. 1,750/- a month. Candidates who have served in His Majesty's Forces for a year or more will receive a higher initial pay.

Private practice may be allowed subject to the certain conditions. Full particulars of appointment and forms of application can be obtained from the Secretary, Revenue Department, India Office, London, S.W.1.

Personal.

COLONEL STORDY, C.B.E., D.S.O., who was, until recently, the Chief Veterinary Officer to the British East African Protectorate, is at present in Peru, where he is carrying out some valuable investigations regarding the improvements in the breeding of the Alpaca sheep for their wool; and a quantity of material sent home to the University of Leeds has attracted considerable attention in the manufacturing world of that city. The Alpaca produces a quantity of naturally-coloured wools ranging from almost white, through blue-grey, fawn, and orange, to dark brown, and as these colours are "fast" they are likely to be much sought after by spinners and manufacturers who are in search of "natural" shades.

Our contemporary, the *Yorkshire Observer*, has a long article upon the subject, written by two well-known scientists of the University of Leeds, and from their remarks it seems possible that the scientific observations of our colleague, Colonel Stordy, are likely to open up a great commercial field which has never yet been approached on a truly scientific basis.

NOTICES.

All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C.2. Telephone: Gerrard 4646. Telegrams: "Bailliart Rand, London."

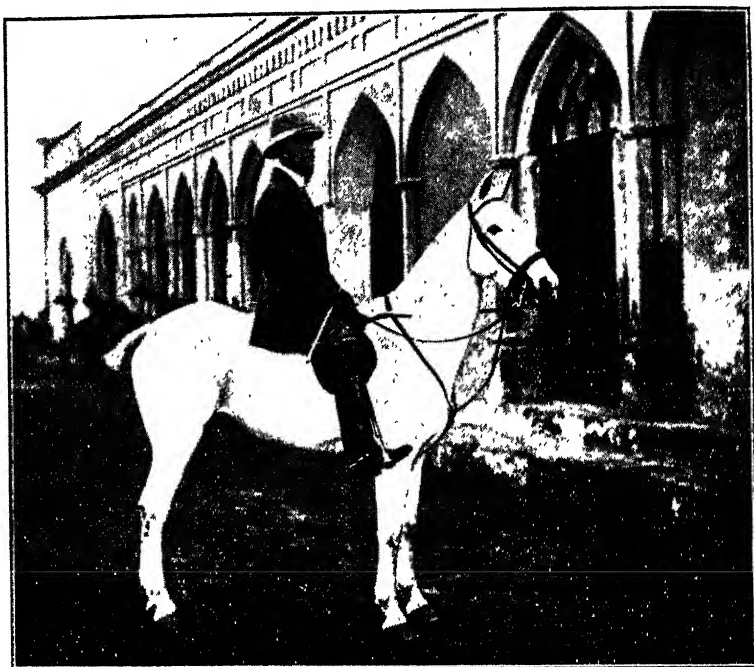
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THE LATE COLONEL JOHN FARMER, C.I.E.

THE VETERINARY JOURNAL

Editor :

FREDERICK HOBDAY, C.M.G., F.R.C.V.S., F.R.S.E.,

HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING.

OFFICIER DU MERITE AGRICOLE (FRANCE).

CAVALIERE DEI S. S. MAURIZIO E LAZZARO (ITALY).

HONORARY MEMBER OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION.
AND FORMERLY PROFESSOR IN THE ROYAL VETERINARY COLLEGE, LONDON

Sub-Editor :

GLADSTONE MAYALL, M.R.C.V.S.

DECEMBER, 1920.

THE LATE COLONEL JOHN FARMER, C.I.E., F.R.C.V.S.

COLONEL JOHN FARMER, C.I.E., who died in Dublin at the beginning of September, joined the Army Veterinary Corps in October, 1893. He served with that Corps at various places in Central India for about eight years, officiating, from time to time, in various appointments at Bombay, Nagpur, and Agmere, in the Indian Civil Veterinary Department. In 1901 he joined the large cattle breeding farm at Hissar in the Punjab, becoming Superintendent of it from October, 1903. Under him the farm did most excellent work in supplying bulls of the well-known "Hissar" breed for breeding purposes in the Punjab, and bullocks and mules for Army purposes. In 1912 he was transferred to Lahore as Chief Superintendent of the Punjab Civil Veterinary Department, which post he held till his death. In it also he did most excellent work, both in encouraging the peasants to use good animals for sires, and to have resort to inoculation against disease.

An excellent linguist, he was a very hard worker and most popular with everyone he met, whether Englishman or Indian. His premature death was, to a large extent, due to devotion to duty. "John Farmer" will long be remembered in the Punjab.

Editorial.

THE UNSATISFACTORY CONDITIONS OF SERVICE OF R.A.V.C. OFFICERS.

ONE very noticeable effect of the great war has been the wider dissemination of a knowledge of the conditions of military service, and a closer sympathy between the civilian population and their military *compagnons*.

This feeling has been no less noticeable in the veterinary profession than in other sections of the community, though many did undoubtedly feel that they had not been adequately compensated for the sacrifices they had made. They were glad, however, to serve in the emergency, as a matter of duty, without being too much concerned as to the amount of the emoluments to which they were entitled.

Rates of pay and pension, and the conditions of service and retirement, therefore, were matters which did not concern them very vitally, and they were mostly content to draw what the paymaster was willing to give them and congratulate themselves that it was no less.

In the regular service, on the other hand, now that the war is over, pay and pension, and the conditions of service, are matters of very grave concern at the present high cost of living, and it will be a great disappointment to the majority of their late brother officers to learn that, in spite of the fine record of the R.A.V.C. during the war, veterinary officers are very unfavourably placed under the new rates of pay and pension authorised in Army Order 324 of 1919. To a casual observer these rates appear much the same for all, but the conditions of service are not the same in the different branches, and we have been at considerable pains to ascertain the exact position of officers now serving in the R.A.V.C. as compared with those of other branches. The situation revealed is even more serious than we had been led to suppose, and it is high time that the profession should realise how unsatisfactory the conditions of service in the R.A.V.C. are under the existing regulations. It is impossible in the space at our disposal to give details of the figures on which our statements are based, but they may be accepted as accurately indicating the position, and can be checked by anyone who cares to take the trouble to study the latest orders in conjunction with the Royal Warrant for pay and the quarterly army list.

The following are some of the more important points, viz. :—

Pension.—Before the war, on completion of 20 years' service, veterinary officers were entitled to retire with a pension of £300 per annum. Under the regulations now in force they are only entitled at 20 years' service to a pension of £285 per annum, while the average pension to which officers of the R.A.M.C., now serving, with 20 years'

service to their credit, are entitled, works out at over £500 per annum. It is true that officers of the R.A.V.C. who joined the service prior to the publication of this order can at present retire at 20 years' service on the pre-war pension, viz., £300, but this fact does not alter the situation very materially. Whether the amount is £300 or £285 it is too small at the present value of money to compensate a professional man for the twenty-five best years of his life spent at College and in the Army, often to the great detriment of his health. As time goes on the difference is not so great as this, but veterinary officers are, on the average, always years older than R.A.M.C. officers on arriving at a corresponding pension rate, and the difference is still greater when the comparison is made with other branches of the service.

In consequence of this, the majority of administrative veterinary officers likely to be promoted in the near future will hardly be able to earn full Colonel's pensions before being compulsorily retired at 57 years of age, while a considerable proportion of the Majors can see little hope of being promoted even to Lieut.-Colonels, however good their record of service may be. The maximum pension of a Major is £450 a year at 27 years' service, by which time their average age will be 51 years.

In the R.A.M.C. and other branches of the service, on the other hand, an officer with a satisfactory record has every likelihood of getting promotion to the rank of Surgeon-General, or Major-General at least, and qualifying for a pension of £1,000 or more. The present position, therefore, of R.A.V.C. officers as regards pension is a very unsatisfactory one. The majority can see little prospect of being able to qualify for sufficient pension to enable them to support a wife and family decently and educate any children they may have, if they remain in the service. Moreover, the pension to which they are entitled at 20 years' service under the new conditions is not sufficient to keep the wolf from the door while a practice or other means of livelihood is being built up, which was one of the inducements formerly held out to prospective candidates for the Corps.

It should also not be overlooked that an officer's pension lapses at his death and his widow is left with only a small pittance.

Pay.—In the matter of pay R.A.V.C. officers, from the rank of Major upwards, are also very badly placed. Field officers of corresponding ages in the R.A.M.C. and other branches are now drawing, on the average, from 30—50 per cent. more in pay and allowances. Moreover, their prospects of rising to the higher ranks are much greater than those of officers of the R.A.V.C., to whom there are, under normal circumstances, only, at most, two Major-General appointments open for the whole Corps.

Officers of the R.A.M.C. and other Corps are also eligible for specialist and command pay, which are not granted to R.A.V.C. officers. The amount of these is not inconsiderable, and they do offer some encouragement to officers who take up specialists' work or hold positions of responsibility, which in the R.A.V.C. is totally lacking.

Under A.O. 324 of 1919 the total pay and allowances of a Major of over 20 years' service (unmarried) is £887 per annum, which, according to figures published by responsible officials during the recent coal strike, is no more than an ordinary miner over 18 years of age can earn if he cares to work conscientiously five days a week.

In view, therefore, of the very heavy expenses to which officers are put, in constantly moving about the world and in other respects, this cannot be considered a fair living wage for a professional man of 44 years of age or over, and in justice to a service which amply proved its worth during the war the regulations should be amended so as to bring R.A.V.C. officers into line with officers of corresponding ages in other branches.

Causes.—The main causes of the unsatisfactory position of R.A.V.C. officers as compared with others under the existing regulations are :—

(1) R.A.V.C. officers, having to obtain the necessary veterinary qualification before they can be granted a commission, are, on the average, five years older than officers of other branches on joining, with the exception of the R.A.M.C., whose officers are compensated for this by more rapid promotion and higher rates of pay and pension than are granted to the R.A.V.C.

(2) The stagnation in promotion caused by the fact that the regulation placing administrative officers on the half-pay list after a definite period in an administrative appointment or rank is not enforced in the R.A.V.C. as in other branches of the service.

Consequently, once an officer of the R.A.V.C. is promoted to the rank of Lieut.-Colonel there is nothing but ill-health to prevent his remaining on the active list continuously until he is compulsorily retired on reaching the age limit. This has the effect of blocking promotion for the officers below him, with the result that some of the senior officers now in the veterinary service will have been able to serve as much as 18 years in the administrative ranks before they are retired, while few of the Majors can hope to serve half as long in those ranks, and a considerable proportion can see little prospect of ever being promoted to Lieut.-Colonel at all.

In other branches of the service, as a rule, officers are placed on the half-pay list after four years' service in an administrative appointment, and this has the effect of obviating the stagnation in promotion which

at present exists in the R.A.V.C. Promotion being almost entirely by time, this makes the Corps a hopeless one for any professional man unless he is well enough off to be able to afford to ignore the financial aspect, and until something is done to remedy the position we would strongly urge any young veterinary surgeon to consider the position well before entering the R.A.V.C.

Under present circumstances it has nothing to offer to professional men of energy and enthusiasm, and young men looking for careers would be better advised to remain in civil life or enter one of the Colonial Government services—which do at least afford opportunities for earning a reputation in special work.

Any who have leanings towards a military life would be much better advised to enter any of the other branches of the Army, in which, no professional qualification being necessary, they can obtain commissions at a much earlier age, and their ultimate prospects are so much better.

General Articles.

THE TATTOOING OF THE HORSE.

By LT -COL. WATKINS PITCHFORD, C.M.G., F.R.C.V.S.
(*Royal Army Veterinary School, Aldershot*).

THE art of tattooing has been practised from time immemorial amongst civilised and semi-civilised peoples as a method of personal adornment or for purposes of differentiation.

Although so ancient, the art in question would not seem to be excelled—and perhaps not equalled—by the modern tattooer with his mechanical advantages, for many of the old Chinese tattoo patterns were of great complexity and beauty of design. Such a high degree of development of the art was possible with the light yellow skin of the Mongol races, but was obviously restricted in the case of the more deeply pigmented Aryan skin, especially as this tended to approach the Negroid type.

An extension of what may be considered the normal tattoo tendency is to be traced in the skin-puncture, and linear incision in regular geometric patterns, such as is practised at the present day by some uncivilised peoples, a practice tending towards the same end as the tattoo mark and attaining this end by the creation of a skin-pattern formed by scar-tissue, where regular cicatrices or fibrous-tissue markings produce a design permanent in character.

A good example of the high degree of development of the art as practised before the Christian era is the incident recorded in history of the Greek slave at the court of Darius, upon whose shaven scalp

a secret message was tattooed addressed to the Greek Aristogoras in Athens. When the hair had grown again after the operation the slave delivered the message to the addressee literally in person, the hair being again removed from his head to disclose the writing. Such a procedure must obviously have called for the exercise of as high a degree of art on the part of the operator as of patience on the part of the slave who was called upon to bear both the operation and the message.

Although essentially masculine in its adoption, the dictates of vanity and the desire for personal adornment would seem to have been chiefly responsible for the establishment of the tattoo. The operation, however, has often been made to serve a more practical purpose in the marking of convicted felons. A tattoo-mark as a proof of identity has of course long been accepted by the Law in evidence, and many criminal charges have been decided by the presence or absence of such a mark upon the person of the accused. It will be remembered that one of the determining facts in the trial of the famous Tichborne claimant was the discovery that the site of a known tattoo-mark upon the claimant's person bore signs of surgical interference, evidently designed to obliterate the mark itself. Within living memory, the custom of tattooing the back of a deserter before discharge from the Army has been abandoned, a custom which in its turn replaced the more barbarous custom of branding even the political offender on his release from the pillory with a hot iron upon the face; or as with the early American settlers, in burning the letter "A" into the flesh of the unfortunate woman convicted of frailty.

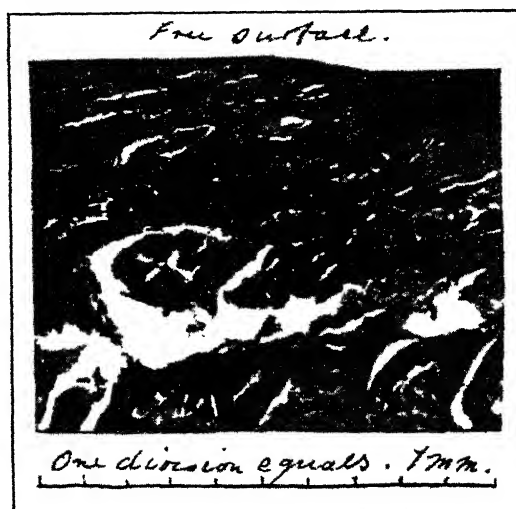
Branding, of course, has from time immemorial been used as a means of differentiation with the lower animals, such as horses and oxen, etc. Apart, however, from the depreciation of the hide of such branded animals and the pain inflicted by the operation, the system of branding has a further limitation in the fact of the non-permanent nature of the mark—unless indeed the iron is so hot or its contact so prolonged as permanently to devitalise the deeper layers of the skin with their contained hair-bulbs.

Although the tattoo instrument cannot in all instances replace the branding iron, especially where mobs of cattle are concerned, it has of late years successfully replaced the latter in the marking of the horse. By the method of tattooing the gum of the horse above the upper incisor teeth, it is now possible to mark the animal in a manner which will afford such conclusive proof of identity as will bring to naught the activities of the horse-coper and the thief. Nor with a system of tattooing is the substitution of one horse for another possible, such as has lately been exposed in a recent *cause célèbre*.

The operation, when once performed with proper material, is permanent in its result, at least so far as the horse is concerned. In man, the consensus of legal opinion allows a lapse of ten years as the minimum period in which a tattoo mark can disappear, while evidence is abundant that such marks often persist for as long a period as 80 years without losing their distinctness.

The question of the permanency of the tattoo mark appears to depend upon the depth to which the puncturing instrument has penetrated the skin and to the nature of the pigment used. Indigo and vermilion tattoo markings, frequently employed in the human tattoo pattern, are much more fugitive than the marks produced by lamp-black (or in cases where gunpowder has been used as the tattoo

FIG. 1.



pigment), probably on account of the complete insolubility of the carbon particle contained in the latter. Where the implantation is deep and the pigment is composed of insoluble and particulate matter, the resulting mark is of a permanent nature providing the surrounding tissue remains undisturbed. The pigment, once deposited beneath the lower layers of the epidermis, lies inert and appears to evoke little tissue response or cellular reaction such as would lead to the encapsulation of the pigment or its removal by phagocytic agency.

Examination of the photo-micrograph (Fig. 1) (which shows a section of the gum made through an old tattoo-mark) shows that the carbon masses comprising the pigment have been forced in a direction

parallel to the free surface of the gum tissue. The smaller particles, lying in the tissue spaces, would all appear to have been floated into their final place by the more fluid part of the tattoo mixture before the final absorption of the same.

That some vital action, probably of a cellular nature, does take place upon the introduction of the insoluble pigment beneath the superficial layers of the skin seems obvious from the differences observable in Figs. 2 and 3, the one (2) showing the diffuse and ill-defined contour of the tattoo-mark in a gum photographed during life, as contrasted with (3), where the operation was made upon the gum of a dead horse. It is to be noted in the latter that the marks are discrete and punctate possessing a well-defined contour contrasting strongly with the appearances produced when the pigment is brought into contact with the living membrane, where a diffuseness of outline has been produced, probably through the removal of the

FIGS. 2 AND 3.



outlying particles by the lymph-stream circulating in the channels and spaces of the tissue during life. Such spaces would be patent and elastic *intra vitam*, and so would permit a certain amount of diffusion of pigment particles, tending to blur the outline of the carbon deposit and permit of the merging or coalescence of the actual puncture points themselves.

No evidence exists pointing to the action of the phagocytic cell as a means of the removal of these carbon particles from the site of their original implantation. In fact, such microscopic evidence as exists would point to the existence of a state of negative chemotaxis in which the pigment particle exerted a repellent influence upon the migratory white-cell, a fact which seems strange in view of the known readiness with which these cells attack and ingest particles of other pigments such as carmine, neutral-red, etc. The existence of a state of negative chemotaxis would explain the special fitness of lamp-black,

or other purely carbonaceous material, for the purpose of the tattooer, who requires as a first essential a permanent or non-fugitive pigment which will neither diffuse nor permit of its absorption or removal by the living cells of the tissue in which it is implanted.

Dyes proper, however intense their hue, are soluble and fugitive, giving rise to a marked blurring of the contour of the tattoo-mark, to an extent which makes it often difficult within a few days of the operation to recognise the original design.

Many of the samples of so-called "Indian" and "Chinese" inks are composed principally of lamp-black, and in such cases are well suited for the purpose of tattooing. Some such inks, however, consist of a simple aqueous solution of the aniline dye "nigraniline," a very intense black but quite unsuited to the purposes of the tattooer. (Such aniline dyes are to be detected with comparative ease by their penetrative

FIG. 4.—a and b.



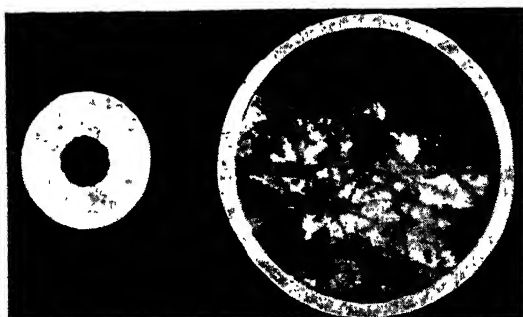
action upon gelatine. If a small cube of this material is soaked for a few hours in a solution of any of the aniline dyes it will be found on section to be deeply penetrated by the dye, a property not shared by the ordinary vegetable dyes.)

Figure 4 serves to show the action of such a dye when dropped as a blot on porous paper, and the magnification of this latter to shew the non-particulate nature of the dye and its diffuse and even standing of the fibres of the paper, an effect which is contrasted in Fig. 4 with the non-diffusing and particulate character of a drop of ordinary lamp-black tattooing fluid.

We are restricted, then, at least so far as the horse is concerned, to the use of carbon (in any form capable of sufficiently minute division). The use of simple charcoal will produce a good tattoo, as many of the old gunpowder tattoos serve to show. This pigment material is

coarse as compared with the carbon deposited in a state of minute division in the smoky flame of an oil-lamp, which constitutes the "lamp-black" proper. "Gas-black"—the carbon deposited by the flame of an ordinary fish-tail gas-burner—is a very black material and to be preferred to the lamp-blacks proper by reason of its freedom from the greasy principle present in these latter. In a series of tests as to the fat content of the various forms of lamp-black carried out at the Army Veterinary School, Aldershot, it was found that a mineral oil lamp-black contained as much as 3.3 per cent. of fat, the fat in the soot from burning olive-oil amounting to only 1.1 per cent., while the other blacks gave intermediated figures. Horse fat and whale fat gave approximately the same percentage (2.03 per cent. and 2.3 per cent.), but the final result of the tattoo-mark from these two materials was distinctly in favour of the latter.

FIG. 4—c and d.



As will be readily understood, the use of a greasy lamp-black leads to trouble in the mixing and fails to produce as good a final pattern as the lamp-black deprived of its fat. This process of de-fatting is carried out by lengthy agitation of the black with ether. In alcohol (cold) the fixed oils are but slightly soluble, but the presence of the spirit helps the mixing of the pigment when water is added in the preparation of the tattoo fluid.

Of the various lamp-blacks tested as to their suitability for tattoo purposes, it was considered that the black obtained from whale-oil gave the best final result, but the differences were not so marked as to warrant the recommendation of this material to the exclusion of others, especially the lamp-black (so called) deposited by the ordinary gas-flame.

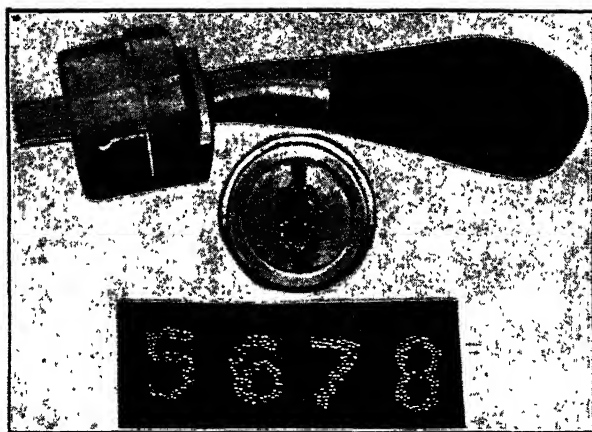
Regarding the technique of the operation in the horse. This is simple and takes but a few moments. With a "head-shy" or fractious

animal a certain amount of restraint is necessary, such as is provided by an attendant on each side holding the head (either by the ear or by the cheek-strap of the halter, or both). The gum itself is a comparatively insensitive structure, and painting the operation-site with an agent such as tincture of aconite serves to deaden the sensation and so to reduce the risk of the horse—by a sudden movement of its head—scratching the gum against the tattoo instrument, and so producing unintentional marks which must mar the final result—an accident especially likely to occur when attempting the operation for the first time. The transitory pain of the operation is not to be compared to the pain inflicted upon the horse in the system of branding the body with a hot iron.

Penetration of the needle as far as the periosteum is not of course necessary to the production of a satisfactory tattoo-mark, but it is difficult to gauge the exact depth of the skin structures and—in the adult horse at least—the sub-dermal connective tissue layer is very thin and the operator must have developed the *tactus eruditus* to an extreme degree to be able to detect when his needles have penetrated but not passed the layers of the skin proper. The disadvantage of an incomplete penetration is obvious, for with the needles thrust lightly and insecurely into the skin, any movement of the horse's head is likely to displace them and lead to a scratching or blemish of the gum and entails the necessity of replacing the needles upon the exact site of the previous puncture and re-thrusting them more deeply. Another reason for the effective thrust is the fact that it is difficult to arrange all the needles in the pattern at exactly the same height when using the instrument shown in Fig. 5, which is the best of its sort yet designed. This slight irregularity necessitates a sufficiently deep thrust to secure the effective penetration of the shortest needle. The question is only one of a small fraction of an inch, but the perfection or otherwise of the finished pattern will obviously depend upon all the needle punctures of the pattern being adequately reproduced upon the gum. Figure 5 shows the general details of the instrument in use for the tattooing of the horse, and the figure is self-explanatory. At intervals it is necessary to take the needles out of the holder for cleaning and replacement of blunt points, but as the reassembling of some of the figures takes some time, this should not be done more frequently than necessary. After painting the gum with the tincture mentioned above, and while a state of local anæsthesia is becoming established, the operator arranges the several tattoo holders in their sequence, each figure being in a separate handle. The chalking of the intended number upon the horse's fore foot is a good practice, tending to minimise risk of error. Where as many as five figures have to be

impressed, it is a good plan to prick the central figure of the number first, thereby securing a balanced spacing of the whole pattern. With the head firmly held, the operator, holding the tattoo instrument in his right hand, grasps the upper lip firmly with his left hand and everts it. The exact site of the figure being accurately determined, the needles should be thrust firmly through the gum, imparting to the instrument not only a deep forward thrust but also a slight rotary or staggering movement, intended to enlarge the needle-track at its extreme depth so as to allow the maximum amount of pigment to be deposited at its ultimate site. The whole of the numbers may then be punctured before the black is applied, or each figure may be blackened separately by painting some of the pigment over the site of the mark and then rubbing the black

FIG. 5.



thoroughly into the punctures with the tip of the finger. It appears to be immaterial whether the pigment is rubbed into the tissue immediately after the infliction of the puncture or whether a short interval elapses, experiment having shown that the pigment may be effectively introduced into the needle-track several minutes after the withdrawal of the needles, or until the ensuing slight inflammatory reaction commences to become established and so occludes the needle-track. Such occlusion is not apparent at $2\frac{1}{2}$ minutes, but is complete in ten. The operator need not therefore unduly hasten to apply the pigment on account of bleeding, etc., as the occurrence of bleeding does not seem to prevent the penetration of the pigment to the full depth of the needle-track if care is taken to rub the black thoroughly into the operation site.

The mixing of the pigment to the consistency of a thick cream, by the addition of glycerine, to prevent drying, facilitates application and tends to render the mixture aseptic, and so to prevent the formation of the many small points of pus which, with the aid of a hand-glass, may generally be seen along the line of the needle punctures a few days after the operation.

The actual dipping of the needles in the tattoo fluid immediately before making the puncture seems devoid of use, as the needle in the act of penetration appears to effectively clean itself and deposit any adhering pigment upon the surface of the skin.

In the young subject the tissue of the gums is thicker (plumper) than is the case in the horse of advanced age, and it would probably be found practicable to employ smaller figure patterns more adapted to the smaller expanse of gum available for tattooing. There must, however, be a limit to the minimum size of the actual tattoo-pattern, inasmuch as the vascular supply of certain areas—such as those enclosed by the figures 6, 8, 9, etc.—might be endangered (owing to such close apposition of the punctures as would amount almost in effect to a linear incision) with the possibility of consequent sloughing of the small areas in question.

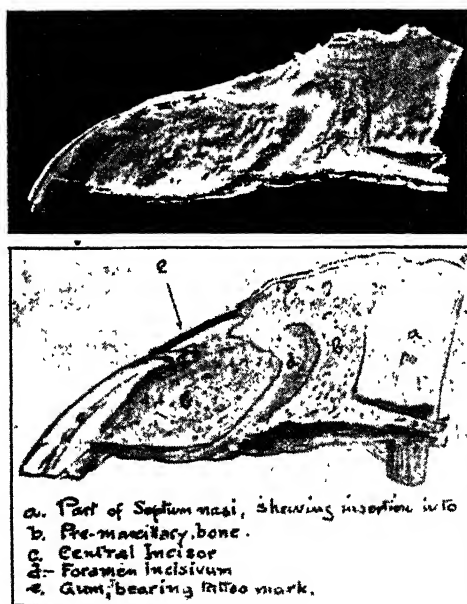
In the adult and old subject the figure once impressed undergoes, of course, no change of size, although the altering shape of the superior maxilla—as the incisor teeth lengthen and the gum tends to recede—causes an alteration in the slope of the tattoo pattern and renders it less obvious. Fig. 6 is a photograph of such a case, the line of incision through the superior maxilla being carried between the central incisor teeth and through the actual site of a tattoo-mark, the pigment composing such mark being seen in section at the point indicated by 6, e, in the schema attached. The very thin layer of gum covering the root of the long incisor teeth is well shown and forms a picture which contrasts with the appearance of a young mouth with its more vertical incisors and thicker gums.

It has been stated as a point in practical working that it is desirable to prevent the horse drinking immediately after the operation, on the ground that the finished pattern is less vivid through the removal of some of the more superficial pigment. While it is difficult to see how such a result could ensue, the precaution is one easily adopted, and in any case no harm can arise from even a prolonged contact of an excess of the pigment with the gum and buccal membrane. If, however, any accidental marks or scratches of the gum have been inflicted, the site of such lesions will of course be permanently blemished. It should therefore be borne in mind that the site of a figure once imperfectly

punctured by the sudden movement of the animal or other cause necessitates a second, deeper puncture on the same site exactly—a result generally difficult to achieve and likely to result in a blurred or double outline, which must stand for all time as an indictment of the unskilled craftsman—

“ The moving finger writes, and having writ moves on ”
—and by no exercise of our wit can we “ lure it back to cancel half a line ” either in the great happenings of Destiny or in so small a matter as the removal of a misplaced tattoo-mark.

FIG 6



Clinical Cases.

REPORT OF A CASE OF RUPTURE OF THE LIVER.

BY BREVET LIEUT.-COL. H. S. MOSLEY, D.S.O., R.A.V.C.

Subject.—An Irish cavalry mare, 15.2, 14 years old.

Previous History.—During eight and a half years' service, the subject had only been sick forty days. The Veterinary History Sheet shows : 21 days with catarrh during the first year of service ; 7 days with a wound during the first year of service ; 3 days with colic during the fifth year of service ; 9 days with a wound during

the sixth year of service. With these exceptions, the mare had been kept in regular work.

Ætiology.—At Reveillé on January 10, 1913, the mare was found dead in her stall. On arrival, I observed the subject was lying on its near side, and by the appearance of the carcase, I should say the mare had been dead about two hours.

There were no signs of struggling, but the head collar was not on the mare. The abdomen was slightly tympanitic; there was no discharge from the normal openings of the body. Blood smears were taken and microscopically examined for anthrax, with negative results.

Autopsy.—There were no signs of any external injury. The *membrana nictitans* and the buccal mucous membranes were very pallid. The carcase was well nourished. The abdominal wall was coated with a layer of fat two inches in thickness. The abdominal cavity contained about four gallons of dark-coloured blood.

Double Colon.—Partial volvulus at the supra-sternal flexure, the retrograde colic artery and colic veins being distended, and their branches congested at this region. The ingesta in the double colon was normal in appearance. There was no inflammation of the mucous membrane.

Small Colon.—Colic mesentery encased in a layer of oily fat, the m.m. and contents normal.

Small Intestines.—The mesentery contained an abnormal amount of fat, the m.m. and ingesta normal throughout.

Stomach.—The stomach was impacted with food, on its anterior face near the greater curvature there was a localised patch about the size of the palm of the hand, of old fibrinous and organised bands of peritonitis. The lining membrane and food were normal.

Liver.—In size slightly smaller than normal, pale yellow in colour, the middle lobe was ruptured at the superior border, the capsule of Glisson was not intact. There were ecchymosis on the posterior face of the lower end of the right lobe. The anterior face was covered with old localised lesions of peritonitis. On section, the liver contained no blood, and the gland substance was very friable and easily broken up.

Spleen.—Small and normal in appearance.

Kidneys.—Normal in size, encased in fat, an inch in thickness. On section, the medullary portion very dark in colour.

Diaphragm.—Thickened at its muscular portion by fatty infiltration, broken down fibrinous adhesions were scattered over the muscular portion on the posterior surface. Ecchymosis over the whole of the anterior surface.

Thorax, Pleura.—Normal.

Lungs.—Dark in colour, due to the vessels engorged with venous blood. At the base of the right lung there were a few broken-down fibrinous adhesions.

Trachea.—The vessels congested, and tracheal tube containing serous coloured froth.

Larynx.—The mucous membrane inflamed, especially at the region of the arytenoid cartilage. The muscles surrounding the throat were very dark in colour.

Vertebrae.—There was no fracture of the cerebral vertebræ.

Heart.—The pericardium was coated with fat, an inch in thickness. The blood in the heart was very dark in colour. Ecchymosis along the ventricular grooves. The ventricular branches of the cardiac arteries and veins congested. There was no abnormal lesion on the endocardium and the auriculo-ventricular valves.

Remarks.—It is suggested that the mare fell when standing asleep, and in the fall, the liver, which was in an advanced stage of ramollissement, was ruptured, setting up internal hæmorrhage, the volvulus of the double colon at the supra-sternal flexure occurring at the same time. The lesions of strangulation were caused by the mare being hung up by her head collar.

SOME CLINICAL CASES.

By OBSERVER.

I.—DISLOCATION OF THE ELBOW JOINT IN A FILLY.

Subject.—A well-bred yearling hackney filly.

History.—The filly had been seen by the owner's son galloping with other horses in the field about 7 p.m., and then suddenly slipping and falling on the near side, with the near fore limb under the body transverse to the long axis of the latter. She got up, but was unable to put the near fore limb on the ground, and carried it flexed at the knee, the metacarpus being almost at right angles to the forearm. Twenty-four hours after the accident the animal was brought to the College in the College ambulance.

Symptoms.—The filly was standing on three legs with the near fore limb flexed at the knee, but not to the same extent as related in the

history of the case. The region of the elbow was greatly swollen, hot, and painful, and on manipulation it was easily ascertained that the elbow joint was dislocated, the humerus and radius and ulna overlapping the latter being on the outside. The beak of the ulna rested on the humerus just above the uppermost extremity of the abcranan fassa.

Prognosis.—Both lateral ligaments being ruptured reduction may be impossible, and even if it is effected, arthritis and ankylosis are likely to result from the severe injury to the joint.

Treatment.—Administered chloroform to the filly in the standing position, and when she fell completely anæsthetised, we endeavoured to reduce the dislocation by various movements, pulling on the limb to bring the articular ends of the bone on the same level, drawing the radius and ulna forward, and using local manipulation and pressure with the object of forcing the articular surfaces into their normal position. Our efforts were of no avail, and we destroyed the animal.

Post Mortem.—We found that the ligaments had been torn away from their insertion into the humerus, a thin layer of osseous tissue being attached to the ligaments at the seat of rupture.

II.—OVARIOCTOMY IN A TROUBLESOME MARE.

Subject.—A chestnut coloured Iceland pony, aged.

History.—Lately the pony became extremely vicious, biting and kicking at any person who approached her in the stable. She was so bad that she could not be worked.

Treatment.—Performed ovariectomy. There was somewhat more difficulty than usual in performing the operation owing to the narrowness of the vagina affording little room for the manipulation of instruments therein. The operation had the desired result, the mare becoming perfectly quiet within a month afterwards.

III.—OVARIOCTOMY OF A MARE SHOWING PAIN AT ŒSTRAL PERIOD.

Subject.—An aged bay polo pony.

History.—At each period of œstrum, the mare evinced symptoms of colic pains, which passed off after the cessation of œstrum. She was also more or less peevish at this time.

Treatment.—Performed ovariectomy, which had the effect of curing the pains, whilst the peevishness continued, which, however, was not sufficient to prevent the animal being used.

IV.—FISTULA IN A HORSE'S JAW.

Subject.—A five years old bay horse of the trooper type.

History.—One year ago, when the mare was taken in from grass, a running sore was noticed on the under aspect of the near side of the

lower jaw, which refused to heal on being antiseptically treated, and afterwards blistered.

Symptoms.—When the mare was brought to me, a festulous orifice was found on the lower edge of the left horizontal ramus of the inferior maxilla, about opposite the level of the third lower molar. The bone was enlarged in the region of the fistula for a width of about three inches, from the inferior extremity of the maxilla to the alveolar border, the enlargement appearing on the inner and outer aspect of the ramus. The swelling was painful on pressure. On examination of the mouth, nothing abnormal could be seen or felt. The mare fed well, but slowly.

Treatment.—Cast and anæsthetised the mare. On inserting a probe into the fistula, it passed readily into the mouth at the outer aspect of the space between the second and third lower molars, whose fangs could be recognised by the probe striking against them. There was a cavity in the base having a capacity about equal to that of a duck's egg. On rotating the probe in the cavity a thick, yellow, creamy, almost solid pus oozed out of the orifice, about sufficient to fill a medium-sized teacup being discharged. I then flushed it out forcibly with plain water, swabbed it with tincture of iodine, and dusted it with pure powdered iodoform, plugged it with gauze squeezed out of tincture of iodine. Dressing was renewed daily for a week, the plug being left out after the third day. There was practically no discharge from the cavity after the operation. The swelling gradually subsided, the pain disappeared, and the animal was discharged cured four weeks afterwards, although the cavity in the bone was not yet completely filled up. The mare fed more readily after the treatment.

V.—ANAL OR CAUDAL FISTULA IN A MARE.

Subject.—A ten years old bay harness mare.

History.—The owner bought the mare six weeks ago, knowing that she had a weeping orifice at the left side of the root of the tail.

Symptoms.—The mare appeared to be lame on the off hind limb, as she sunk on the near one during progression. On the left side of the root of the tail in the fold of skins, between the tail and perineum, there was an orifice whose diameter was equal to that of a lead pencil, from which yellow pus exuded. An ordinary probe passed into the opening failed to reach the extremity of the fistula, and on inserting instead, a narrow gum elastic catheter, the passage was found to extend forwards for a distance of ten inches between the rectum and the sacrum.

Treatment.—Cast and anæsthetised. Incised the upper wall of the fistula for a distance of about six inches, until the finger could

reach the blind extremity of the sinus, where granular inspissated pus was found confined in a depression below the level of the external opening. The black epith had grown into the floor of the fistula for a distance of about two and a half inches. I pared away the lining with the knife. Completely evacuated the sinus of the pus by forcible irrigation with a large syringe. Injected tincture of iodine, insufflated powdered iodoform through a piece of hose-piping, plugged the cavity with gauze saturated with tincture of iodine, six yards being required to fill it. Dressed the lesion daily for a while with tincture of iodine, iodoform, and plug of iodinated gauzes. When it appeared covered with healthy granulations the dressing was discontinued, and the cavity was gradually filling in without any discharge when the mare was sent home, complete cure being only a question of time.

VI.—DIGITAL LIGATION FOR SUB-ACUTE LAMINITIS.—CASE I.

Subject.—An aged American pacer, said to have been very fast. In good condition and apparently quite sound, except for great lameness in front.

History.—The horse had been lame for several months, and could not be got to go sound. He was the property of a carman who kept fast horses.

Symptoms.—The horse was very lame in both fore limbs, being reluctant to move, and when forced to do so, he went on his heels in front, and brought the hind legs well under the body. When at rest, he stood with the fore limbs propped out in front. There was no fever, and the animal fed well. The soles were flat.

Treatment.—A hypodermic injection of adrenalin was tried over each digital artery on two occasions without effect. I then performed digital ligation in the standing position after injecting cocaine over the plantar nerves. There was very marked improvement within a week after the operation, and the improvement continued, the animal being discharged in a fortnight almost perfectly sound, trotting at a fast pace, with great freedom, which delighted the owner.

CASE II.

Subject.—An old grey cob, with clean limbs, which had done great service for the owner, a carman.

History.—The cob had been going lame on and off for months, and was now constantly lame.

Symptoms.—Decidedly lame in front, the animal going with a pattering gait on his heels. The soles of the fore feet were flat.

Treatment.—Performed digital ligation, which had a very good effect, enabling the animal to return to work.

VII.—INGUINAL HERNIA IN A BITCH.

Subject.—A brindled Great Dane bitch about seven years old.

History.—A large swelling formed between the hind legs about a year ago, which occasionally caused the animal to suffer pain.

Symptoms.—The bitch was in good health, but not in the best condition. There was a swelling almost as large as a man's head in the inguino-perineal region, hanging down as far as the hocks. On placing the animal in the dorsal position, and manipulating the armour, it was found to take origin in the left inguinal region. Its consistence was semi-solid, and it was corrugated to the feel in its depth. It could not be reduced.

Diagnosis.—Inguinal hernia.

Treatment.—Anæsthetised the bitch in the dorsal position. Incised the skin antero-posteriorly at its centre for a distance of about three and a half inches; incised the peritoneum to a similar extent, and found the uterus inside it with a large quantity of fat in its broad ligaments, which gave to the tumour its corrugated feel. Ligatured the body of the uterus and the two horns behind the ovaries, as they could not be reached through the inguinal opening, and removed the entire organ.

Ligatured the peritoreal sac; did not suture the hernial ring, which was comparatively small; sutured the skin with a small plug of gauze beneath it. Removed the gauze plug the next day, dressed with tincture of iodine. Renewed the tincture of iodine for a few days, and then discontinued the dressing. The wound filled in gradually and was completely healed in a fortnight, when the animal was discharged completely cured.

PREVENTION OF CAPPED ELBOW.

BY CAPT. J. R. HODGKINS, D.S.O., F.R.C.V.S., R.A.V.C.,
Secunderabad, India.

MANY, perhaps the majority of, capped elbows are caused by contact with the ground of the affected part.

Recognising this fact, Mr. Conrad, T.E., writing in *L'Echo Vétérinaire*, June, 1919, describes what he terms "Un coussin sous sternal."

The pad is made by wrapping several layers of sacking round a surcingle (Bibliographical Notes—Surgery—Veterinary Review, Vol. iii, No. 4, Nov. 19).

In imitation of this the present writer had a pad made, of which the following is a description:—It consists of stout basil stuffed with coir and ventilated by means of eyelet holes. It is supported by

webbing over an ordinary surcingle pad. The interior edge of the pad is recessed to admit the elbows when the animal is standing.

In order to keep the sternal pad in the required forward position, it is also fitted with a webbing passing across the breast.

Of several devices, one (which the writer considers will not be wrongly attributed to Mr. J. MacQueen) consists of an extension, with numnah, of the rug 18 ins. deep and 2 feet long.

This is excellent, but obviously unfitted for a part of the world where rugs are never worn.

HABRONEMIASIS.

CAPT. J. R. HODGKINS, D.S.O., F.R.C.V.S., R.A.V.C.,
Secunderabad, India.

In the June number (1920) of this Journal were published some results of post-mortem examinations on horses which were found suffering from *Habronemiasis*.

The patient, an Australian gelding trooper, ten years old, on post-mortem was found to be infested with *H. microstoma*.

The horse salivated constantly at feeding time and frequently in the intervals.

He was thrown on three occasions, his teeth carefully regulated, and every visible part of the mouth and pharynx examined for a clue as to the cause of the ptyalism.

A vermifuge test was carried out after a 36-hour preparation by fasting.

He received	R. Thymol	ʒiiss.
	Chloroform	ʒiii.
	Ol. Tereb.	ʒii.
	Ol. lini.	oii.

The result of this was positive and efficacious for certain round worms, for a careful search revealed none at post-mortem examination.

It had no effect on *Habronemæ*, which were alive and well in the stomach.

It was disappointing to find nothing to account for the constant slobbering. It is not a symptom of *Habronemiasis*, for it was not present in any of the cases previously recorded by the writer. There were no positive symptoms of this stomach disease.

But if the vermifuge test is carefully carried out with either the prescription given or with oil of chenopodium, it will be found that if the debility is due to strongyles or oxyures, the horse will rapidly pick up and put on flesh at the rate of 10-20 or even more pounds per week. The horse illustrated, if furnished, should weigh over 900 lbs.

In a case now under treatment which is suspected of being a case of *Habronemiasis*, a trial is being made of carbon bisulphide, followed by weekly injections of atoxyl. The debility card attached gives information as to feeding, weights, etc.

DEBILITY CARD.

Unit.	No.	Date of Admission	Probable Cause.			
	A 82	1-8-20	Parasitism Intestinal.			
Examination ...			Result.			
	Mallen Test ... Blood Examination ... Vermifuge Test ... Dental Examination ...		Negative. Negative. Positive. Oxyures Cyclostomes. Enamel Points. Wolf's Teeth.			
Weight ...		Cwts.	lbs.	Gain.	Loss.	
	Admission ...		770	...	...	Total Absolute Loss= 20 lbs.
	1st Week ...	...	...	...	...
	2nd " ...	...	760	...	10	
	3rd " ...	...	750	...	10	
	4th " ...	...	772	22	...	
	5th " ...	...	768	...	4	
	6th " ...	...	750	...	18	
	Total ...	...	...	22	42	
Rations ...					Lbs. per Day.	
	Barley ...	...	...	...	2	Five Feeds per Day.
	Gram ...	...	...	...	2	
	Koolthi ...	...	...	...	...
	Oats ...	...	...	...	6	
	Linseed ...	...	...	...	...
	Bran ...	...	...	...	2	
	Dry Grass ...	...	...	...	15	
	Chaff ...	...	...	...	5	
	Lucerne ...	...	...	...	5	
	Guinea Grass ...	...	...	...	5	

Result and Remarks. No improvement.
The animal had been in Hospital three times previously for pytalism.
Not likely to be of further use in the Service; destroyed.

LENGTHY INVAGINATION OF THE SMALL BOWEL IN A COW.

By HUGH BEGG, F.R.C.V.S.,
County and District Veterinary Inspector for Lanarkshire.

SOME time ago, through the courtesy of a veterinary friend who acts as visiting Inspector of Meat at the abattoir of a Burgh in this

County, and with whose consent the case is recorded, I had the privilege of examining what can be described as an unique case of invagination of the small bowel, the telescoped unit being fully four feet in length.

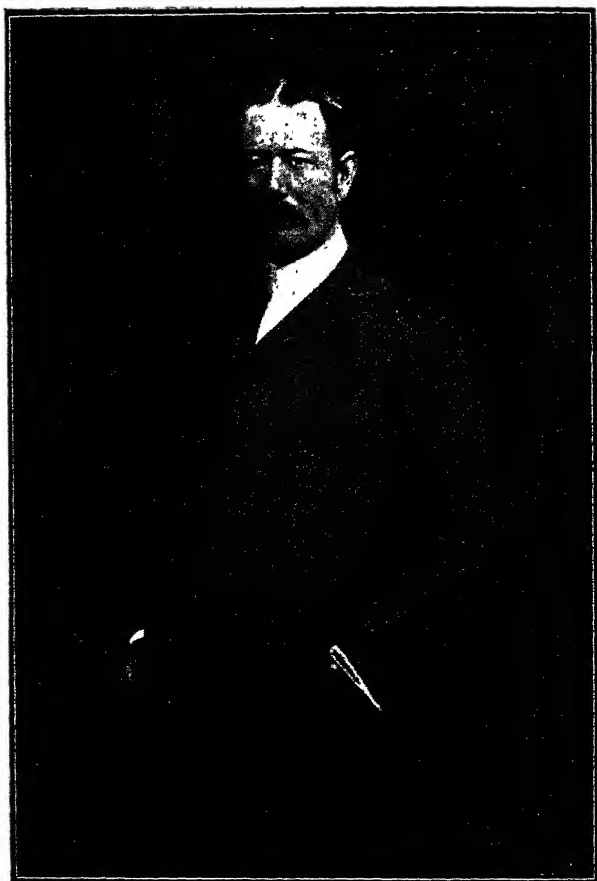
The subject was an aged white and brown Ayrshire cow in good killing condition.

History.—She had been bought by a dealer in fat stock at an Auction Mart, and was brought to another Mart for re-sale. She refused food, and is said to have been ill at ease when housed at the second Mart and so was not put up for sale. The owner, thinking she might recover soon, did not seek professional advice, but finding that she was likely to die after seven days, he had her conveyed to the local abattoir with the object of salving what he could of her value. It was asserted that the cow never exhibited any very marked signs of pain, the chief symptoms being slight tympany, an absence of fæces, dullness of countenance, and stolidity in deportment.

Appearance of the invagination.—There was considerable evidence of local peritonitis with an abundance of fibrinous exudate covering the affected part which was of a dirty variegated dark-red colour. The anterior portion of the bowel had invaginated itself into the posterior, forming a triple cylinder of bowel fully four feet long.

Attempts to undo the invagination failed owing to the strength of the adhesions. When handled, the part felt like a well-filled sausage, excepting that it did not pit on pressure. When cut across at the posterior extremity, the surfaces showed the triple layers very distinctly, though they were thickened and firmly adherent owing to the tenacious intervening exudate. Bisected near the middle of the invagination, the layers had a less discrete appearance owing to advancing necrosis, which rendered the cut surface more homogeneous or concrete, but of a dirty reddish-purple colour. The post-mortem revealed no other lesion, and the carcass was condemned.

The cause of the invagination can only be guessed at, there being an absence of earlier history, but the vicissitudes of the marketing of animals often embrace causes that are considered potent to produce intussusception of bowel, *e.g.*, the liberal giving of proteid food of whatever kind that is at hand to an animal that is hungry after a period of fasting, violent exercise and over-exertion followed by thirst and the drinking of large quantities of cold water, any of which is liable to set up irritation, spasm and catarrh of the bowels and diarrhoea.



THE LATE MR. W. C. HAZELTON, M.R.C.V.S.

THE LATE MR. W. C. HAZELTON, M.R.C.V.S.

A MAN of exceptionally fine physique and apparently in the best of health, it came as a shock to his relatives and friends to hear that Mr. Hazelton had died suddenly; and by his death the county of Buckingham lost a loyal gentleman and a good practitioner, Popular with all classes, a good sportsman and follower to hounds, and an excellent veterinary surgeon with all classes of stock, William Hazelton had made for himself a very large *clientèle*; and, what is more, he enjoyed the confidence of his neighbouring practitioners, who frequently relied upon him for consultation. Known to be "straight," he always "played the game," and the extent of his practice was a tribute to his skill. Although not taking any active part in the politics of the profession, he was a keen observer and well up-to-date in everything pertaining to progress; whilst in local affairs his name did honour to the profession. A graduate of the New Veterinary College, Edinburgh, he completed a very creditable student career by winning the second place in the Fitzwygram Competition. For many years he held a commission as Veterinary Officer in the Yeomanry, and during the past war he rendered valuable service in the purchase of remounts. His loss in the district will be keenly felt, and his name, as a practitioner, will long be revered as that of one whose advice was given with mature judgment, and, once given, was invariably followed without quibble, even though it meant the condemnation of a valuable animal. The profession can ill afford to lose such men, and to his family and personal friends his loss is irreparable.

Reviews.

A BRIEF REVIEW OF THE REPORT OF THE CHIEF VETERINARY SURGEON AND THE VETERINARY BACTERIOLOGIST OF SOUTHERN RHODESIA FOR THE YEAR 1919.

THIS is an extremely interesting report, and describes much useful work, mostly performed under trying conditions. African Coast Fever continues to be the most troublesome infectious disease of the territory. In dealing with the question of the distribution of the staff some significant remarks are made. "A heavy mortality, whilst suspicious, is by no means an indication of the existence of an infective disease. Serious losses occur frequently from poverty and other causes. . ."

Of the total mortality amongst cattle in this country, the writer estimates that not more than 6 per cent. is due to scheduled infective diseases, including quarter-evil.

"The solution of Coast Fever and various other difficulties rests largely with the stock owners and not on laws and regulations."

1920 8 fresh outbreaks. 798 head mortality.

1919 5 " 374 "

Dipping has proved very effective in dealing with infected areas, and as a means of preventing infection on areas where it has been practised for a number of years. Dressing of ears and tails is considered unnecessary in the case of animals which have previously been regularly dipped. The disease appears capable of repression; animals recover from a slight attack, and later succumb from a virulent attack when the rains wash off the arsenic from the skin, and the dips become reduced in strength by reason of the rains.

"The possibility of a suppressed form of African Coast Fever as the result of short-interval dipping is a matter of practical importance, and deserving of the closest investigation in the laboratory and in the field." During the year 229 dipping tanks were constructed, bringing the total up to 1,583, but many more are required.

Quarter Evil.—Three distinctive facts have been observed. (1) The disease appeared more contagious than sporadic at the beginning of the outbreak. (2) Mature, and even old, animals succumbed in a small percentage of cases. This was generally only on the first visitation to a herd. (3) Animals died all the year round.

"Germ-free" preparations were largely used for inoculating purposes. These were first tested on sheep, and one of these proprietary "filtrates" failed to protect; a second test showed it was more successful in larger doses than recommended by the manufacturers. Another proprietary "germ-free" material proved more successful. It was impossible to experiment with cattle, and results from sheep may not apply to cattle.

Anaplasmosis and Piroplasmosis in cattle were more prevalent than in the previous year. The increase in the prevalence and mortality is accounted for as in the last report, viz.: (1) Increased tick activity, the result of ineffectual dipping. (2) The relatively greater susceptibility of pure-bred and grade stock, and an exultation of the virulence, particularly of gall sickness, by passage through them. Virus vaccine was used for animals reared on tick-free farms.

Rhodesian-bred, pure bred or grade animals were sent into inoculation camps from dipped areas.

25 were inoculated; 16 gave redwater reaction; 24 gave anaplasmosis reaction.

Contagious Abortion has been found to be wide-spread throughout the territory. In most cases the specific nature was not suspected by European or native owners. "There is one instance of a native regarding it as dangerous, because his method of dealing with aborters was to sell them to the first buyer that came along." (We have observed similar instances amongst more civilised races.)

Dipping was found useful as a protective measure. Devitalised vaccine prepared at the Veterinary Laboratory was used in conjunction with the usual methods.

Useful results appear to have been obtained. It is not claimed to eradicate or prevent the spread of disease by these means, but anything that will produce an early return to normal catering is considered useful.

Tuberculosis.—The only case recorded was an aged Sussex bull, originally imported from England. At the Johannesburg municipal abattoirs eight cases were detected on "post-mortem" inspection of Rhodesian slaughter cattle.

Horse Sickness.—Perhaps the most interesting reading of the whole report, at any rate to horse owners in South Africa, is of the work on this disease by the Bacteriologist. The following tables are reproduced from his report in October giving the results of the inoculation of police horses by his method from August, 1912—July, 1919.

SUMMARY OF POLICE HORSES INOCULATED AND RESULTS.

Season.	Number treated.	Died under treatment.	Number of inoculated horses exposed.	Died on exposure.	Died from other causes.	Sold.
1915	6	1	5	...	...	...
1915-1916	32	2	35	...	...	...
1916-1917	115	17	133	8	6	3
1917-1918	29	6	139	7	3	...
1918-1919	38	7	160	4	1	...
	220	33 =15%	472	19 =4%	10	3

SHOWING NUMBER OF SEASONS SURVIVED BY INOCULATED HORSES.

Date inoculated.	Number inoculated.	Died under inoculation.	Leaving.	Seasons survived.			
				4.	3.	2.	1.
Prior to 1915	6	1	5	4	4	4	5
1915-1916	32	2	30	25	25	27	30
1916-1917	115	17	98	...	77	77	86
1917-1918	29	6	23	...	...	21	21
1918-1919	38	7	31	...	...	...	31

29 horses out of 35 exposed have survived 4 seasons.

106 " " 133 " 3 "

129 " " 156 " 2 "

173 " " 187 " 1 season.

Note.—These figures include deaths and reductions from causes other than horse-sickness.

He modestly states: "It is true that the results of the application of the virus-vaccine method have been fairly satisfactory, but the many problems associated with the cause, transmission and cure of the disease still remain to be solved."

He also reiterates a sentence from this report ending with the following significant remark: "I should prefer in future to devote

my energies to purely experimental work rather than to the application of an imperfect method of inoculation." Two interesting diseases of cattle, which space prevents us from more than mentioning, are myiasis, "screw worm disease," and "sweating sickness."

The former is caused by the larvæ of certain flies burrowing through the skin and into the tissues underneath.

The latter, in addition to profuse sweating, shows symptoms of high fever, congestion of mucous membranes, mucoid discharges from the eyes, nostrils and external orifices, and a soapy saliva from the mouth.

The report of the Bacteriologist, as usual, concludes with a plea for more convenience for research work.

J. M. A.

Correspondence.

SALARIES OF THE INDIAN CIVIL VETERINARY DEPARTMENT.

To the Editor of THE VETERINARY JOURNAL.

SIR,—I have read with interest the article entitled "The Indian Civil Veterinary Department: a Retrospect and a Warning," by "Anglo-Indian," which appeared in *THE VETERINARY JOURNAL* of November, 1920, and I feel that I should like to add the following remarks, because I know the good work which has been done by the C.V.D. in Madras since its conception in that Presidency. It is a department with which I think I may be allowed to claim that I was very closely connected, and, although I retired early in 1915, I get frequent news of the excellent work that is being carried on.

I always felt we could never hope for real success unless we had an efficient European staff to navigate the work; but alas, all that was given was a superintendent in charge of the Madras Veterinary College and a travelling superintendent for the entire Madras Presidency. Even with this, most useful work was done, and I feel sure the names of Colonel Gunn, Major Holmes and Messrs. Achison and Ware will always be remembered by all lovers of horses and cattle owners in the Presidency.

It would be no exaggeration to say that no period of India's connection with Great Britain witnessed such far-reaching changes, both material and intellectual, as those which have occurred during the last quarter of a century. In these the C.V.D. has directly played a great part, and its little handful of willing though poorly paid workers has done wonders among the millions of people who are the owners of many millions of animals.

I believe it was the intention of Government to make India produce its own veterinary practitioners, and possibly that day may come, but not just yet. For the present we must look to the Mother Country for our superior staff, and the only way to get good men is to make it worth their while to go out to India. The whole question rests on salary, and to secure good men they must be paid enough to tempt them to go to India, where the general price level shows a steady increase. The rise was, I remember, specially high in 1905, and in

1910-1912 it was higher still. This rise affected officials with fixed salaries to such an extent that the Home Government ordered a Commission to go to India, with the result that the pay and pensions in the uncovenanted services were increased. It is claimed by Europeans in India to this day that it is the general price-level which has contributed to still render service in India less attractive.

I do not think the Commission referred to did much to make the Civil Veterinary Department more popular, and I feel sure that it will be cheaper in the long run to pay better for the services of skilled men, whose parents have had to pay out a good bit before their sons could get the enviable letters M.R.C.V.S. affixed to their names. —Yours truly. •

C. V. DALRYMPLE HAY,
Acting Deputy Commissioner (Retd).

c.o. National Provincial Bank of England,
Piccadilly, W.1.
November 13, 1920.

To the Editor of THE VETERINARY JOURNAL.

DEAR SIR,—“Anglo-Indian’s” letter in *THE VETERINARY JOURNAL* presents, in my opinion, the case of the I.C.V.D. clearly and concisely. It shows once again how a department—essential to the prosperity and progress of our Indian Empire and for long refused fair treatment by Government—is forced to take combined action in order to obtain suitable conditions of service.

Though such action has been taken in the past by other departments of the public service with successful results, Britain’s loss of prestige is not inconsiderable in a country like India. It is always harmful to the public service when discontent is rife in a department and Government is forced eventually to concede better conditions.—Sincerely yours.

27, Cadogan Gardens, S.W.
November 7, 1920.

C. STRACHEY,
Colonel.

VETERINARY PROPAGANDA.

To the Editor of THE VETERINARY JOURNAL.

It is encouraging to think that the veterinary profession is beginning to see the necessity of educating the general public in the work carried out by its members. There is a general idea, not only among the uneducated, but the educated classes, that the work of a veterinary surgeon is restricted to curative treatment.

It is only a few years back that doctors were similarly recognised, and that the student of hygiene and a bacteriologist belonged to another profession.

The progress in the study of veterinary science, within recent years, is only appreciated by a small minority of the general public,

principally due to the fact that they have never been informed or have had opportunities of gaining information.

As a professional body, are we justified in breaking the precept of hiding one's light under a bushel?

To give an example. If there had been more publicity in veterinary research, would not the general public have realised the dangers of introducing rabies into this country, taking for granted that although there are a few individuals whose idiosyncrasy is to break all laws and regulations, yet the majority of people do so through ignorance of the consequences.

It is up to us as a profession to try and interest the public in veterinary science, particularly relating to prevention of diseases.

Even during the war difficulties arose in this particular subject from want of knowledge.

A new army was formed, a great number of soldiers had no idea of the management of animals; a veterinary officer was considered the technical adviser on animal disease, principally after disease had occurred, or to control an outbreak of diseases of a contagious nature; but it didn't dawn on all that economics, hygienic and general stable management of horses also came under the duties of the veterinary officer, otherwise the appointment of horse advisers, filled by laymen, would have never been created.

Periodically, in the *Times*, there is an article written "By Our Medical Correspondent," which deals with disease, prevention and control of disease, new medical discoveries, which undoubtedly keep the general public interested in medicine, which in turn is good propaganda work.

There is no doubt, if we want the support of the general public, we must interest them in the research work of veterinary science, and there is no greater opportunity than now, and a great deal can be done by a selected publicity committee furnishing articles to the daily papers under the heading of "Our Veterinary Correspondent."—Yours faithfully,

H. S. MOSLEY,

Lt.-Col., R.A.V.C.

NOTICES.

All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C.2. Telephone: Gerrard 4646. Telegrams: "Baillière Rand, London."

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"Annual Report of the Punjab Veterinary College, Civil Veterinary Department, and the Government Cattle Farm, Hissar, for the year 1918-1919" (Constable and Fisher Unwin), 79.

"Annual Report of the Civil Veterinary Department, United Provinces, for the year ending March 31, 1919." (Government Press, Allahabad), 200.

"Department of Agriculture, Canada." (Torrance - Labroquerie Taché), 119.

"Early History of Veterinary Literature and its British Development" (Smith-Baillière), 38.

"Journal of the American Veterinary Medical Association," 236.

- "Report of the Civil Veterinary Surgeon and the Veterinary Bacteriologist of Southern Rhodesia, 1919," 467.
 "Review of Applied Entomology" (Bureau of Entomology), 80.
 "Veterinary Doses and Prescription Writing," (Fish-Cornstork), 437.
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